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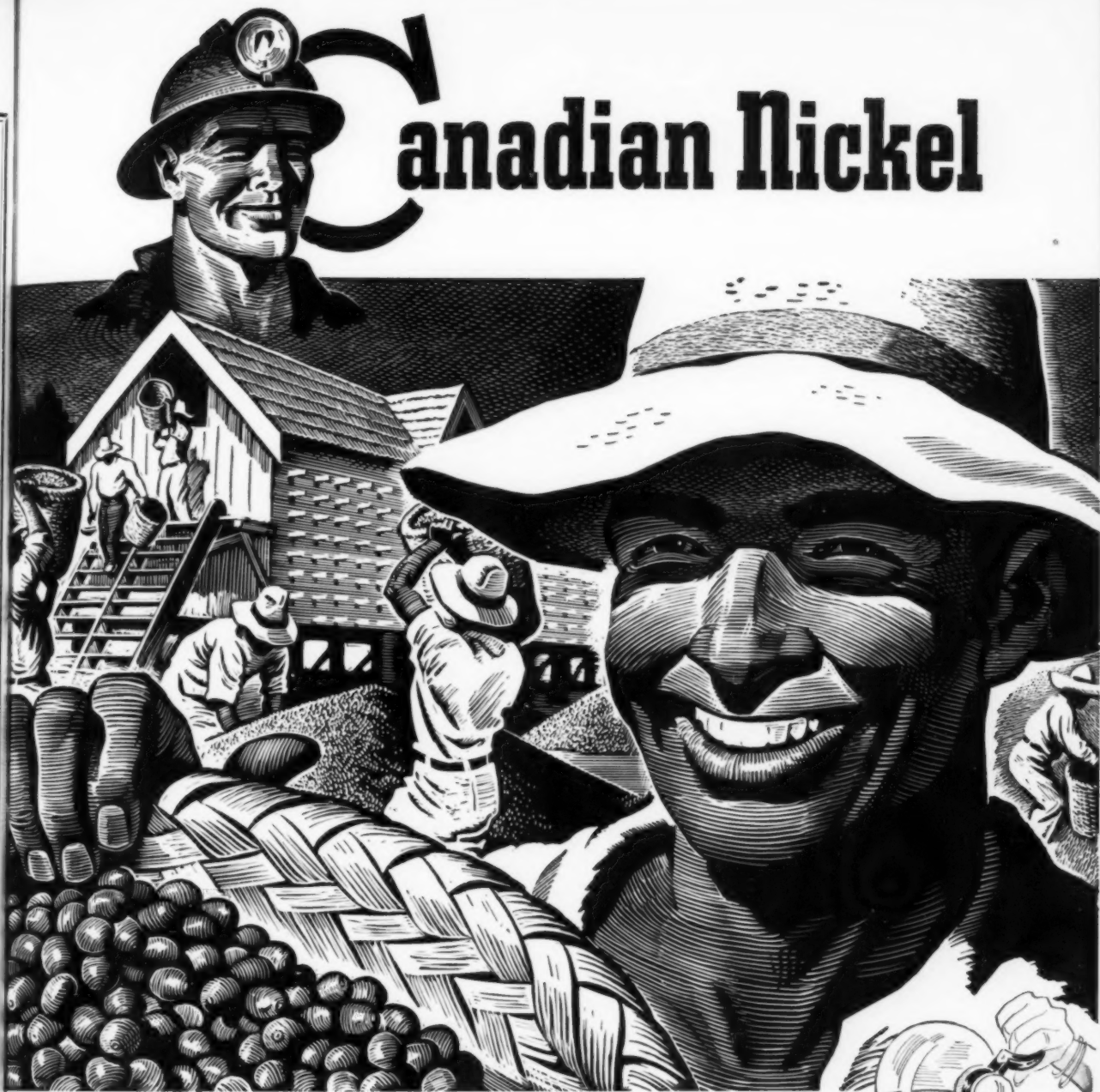
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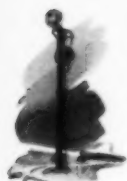
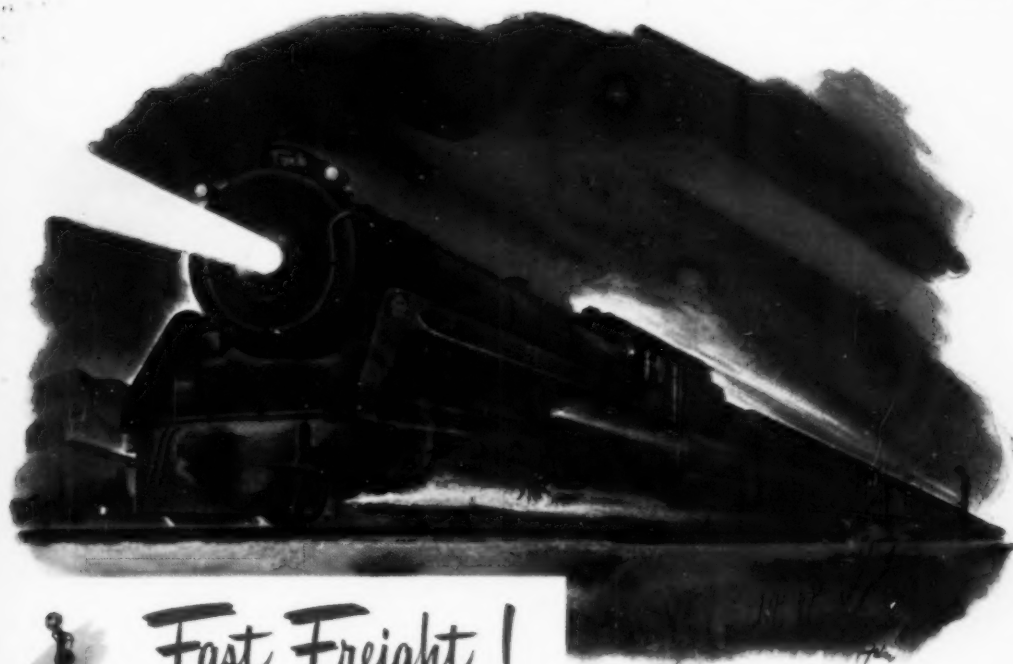
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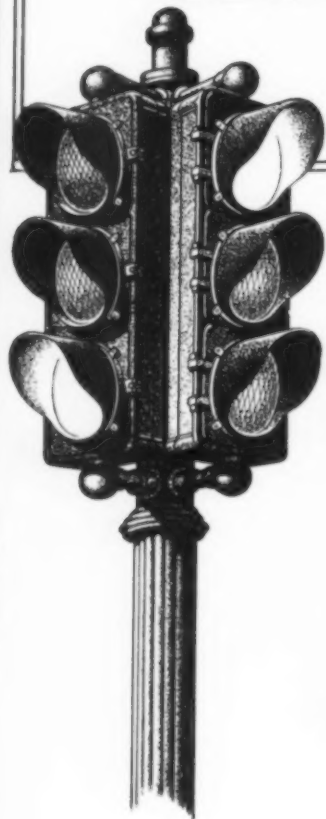
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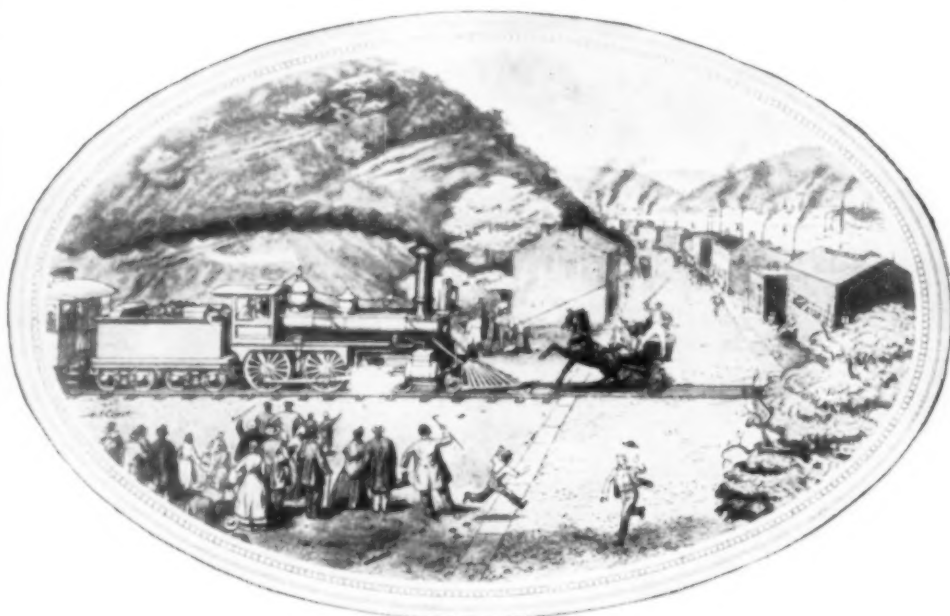
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Plates courtesy *Fashion*, Montreal

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Exploration and Settlement of Mackenzie District, N.W.T.*

by M. J. and J. L. ROBINSON**

(PART I)

MANY WHO have read about the recent production of oil at Norman Wells, the extraction of radium and uranium at Port Radium, and the gold-mining activity at Yellowknife, have realized that the settlements of Mackenzie District, Northwest Territories, are now playing a significant part in world affairs. There is a story behind the rise of these modern settlements which is a little-known chapter in Canadian history.

Just as mineral discoveries are now attracting numerous people to Mackenzie District, so it was that the search for a mineral—copper—brought the first white explorer into the region 176 years ago. During the intervening years history has moved slowly, but has contained exciting tales of exploration and records of the first lonely post settlements.

Early Exploration, 1770-1850

Samuel Hearne, employed by the Hudson's Bay Company, left Fort Prince of Wales (now Churchill, Manitoba) in December, 1770, with a band of Indians from the interior, hoping to discover the source of the copper which had often been brought to the post. The Company encouraged his overland expedition because it was hoped that his exploration might also throw some light on the supposed existence of a sea passage north of the Canadian mainland.⁽¹⁾ Hearne reached Coppermine River about 40 miles from its mouth and mapped the remaining distance to the sea. Although his computed latitude proved to be too far north, his travels were important geographically because he located the first section of the northern mainland of Canada. (See Hearne's

*Prepared at the Bureau of Northwest Territories and Yukon Affairs, Lands, Parks and Forests Branch, Dept. of Mines and Resources, Ottawa.

**Photos by J. Lewis Robinson except where otherwise credited.

At top:—The business section of Yellowknife, N.W.T.—built up on the side of a bare, rocky hill.
Photo by F. Whyard

EXPLORATION AND SETTLEMENT OF MACKENZIE DISTRICT, N.W.T.

route on the accompanying map of exploration.)

Hearne's return trip lasted almost a year, during which time he lived the same roving, hunting life as did his Indian companions. His sketch map of his travels provides us with our first record of the huge interior body of water now called Great Slave Lake. In the spring of 1772 Hearne and the Indians turned eastward and snow-shoed through 600 miles of woods, arriving back at Fort Prince of Wales at the end of June.

Hearne's overland trip supplied evidence of the magnitude of the mainland of Northern Canada. It was realized that, instead of a narrow strip of land barring the way to the riches of the Far East, a whole continent stretched west of Canada and the American colonies. Within a decade of Hearne's travels fur traders of the North West Company in Montreal were penetrating Mackenzie District from the south. Their aim was to trade directly with the Indians and cut off the Hudson's Bay Company's supply of furs at its source.⁽²⁾

In 1786 a trading-post was established temporarily by Cuthbert Grant on Great Slave Lake, a short distance east of the mouth of Slave River. It was the first white habitation within the present boundaries of the District but was withdrawn in 1787. In 1788 the North West Company built an important trading-post, called Fort Chipe-

wyan, on the south shore of Lake Athabaska, about eight miles east of Athabaska River. It was from this post, which was to become the distributing centre for the entire northwestern fur trade, that Alexander Mackenzie left on June 3, 1789, on his historic canoe trip to the Arctic Coast.⁽³⁾

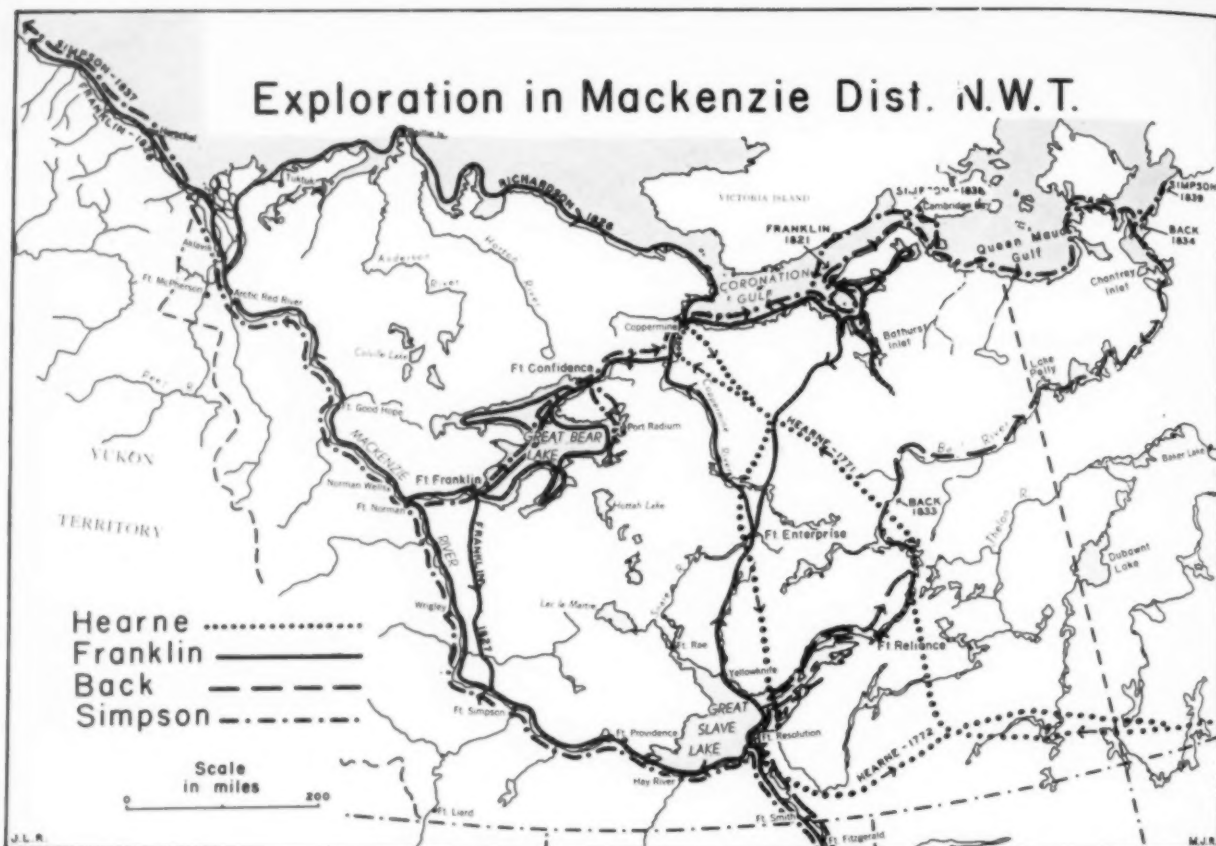
Mackenzie and his accompanying group of Indians and French-Canadians reached Great Slave Lake on June 9, but found it still ice-covered. The canoe party finally worked from island to island across the east side of the lake to Yellowknife Bay where they met a band of "Red-Knife" Indians. Had Mackenzie been seeking gold instead of sources of fur he might have looked more carefully at the rocks of this now-famous bay! From here, Le Roux, Mackenzie's assistant, travelled overland to Lac La Martre and returned to Yellowknife Bay in the autumn to build the trading-post of Fort Providence (not to be confused with the present Fort Providence).

In the meantime, Mackenzie, still impeded by ice-floes, crossed the North Arm of Great Slave Lake, and reached the outlet of the lake on June 29. His expedition, comprising four canoes, then paddled and floated down the broad river which now bears the discoverer's name, experiencing few difficulties during the journey. Mackenzie met several unknown tribes of Indians with whom he traded, and his accurate

Looking down Coppermine River at Bloody Falls, so named because of the massacre of a band of Eskimo by Samuel Hearne's Indians on July 16, 1771.

Bureau of N.W.T. & Y.A. photo





description of their clothes, utensils and habits forms our first record of the Valley's native inhabitants. On July 13 he had twisted through the maze of channels in the Mackenzie Delta to find his way blocked at Whale Island by ice-floes filling the "lake" to the north. Within the next few days he saw a school of white whales and noted a slight rise and fall of a tide. Even with this evidence, there is some doubt in Mackenzie's journal as to whether he had actually reached the sea.

Mackenzie's return journey, although uneventful, was more difficult because of the current. His journal gave some of the first

indications of the mineral wealth which was to be found in the Valley. East of Arctic Red River he noted that: "Among the pieces of slate are pieces of Petroleum, which bears a resemblance to yellow wax but is more friable". Near the present site of Norman Wells he remarked on several small sulphur springs, and south of the mouth of Bear River described a bed of coal which was burning in the bank of the river.

Mackenzie's exploration demonstrated the navigability of 1,500 miles of new waterway, and located another point on the northern mainland. During the following three decades several posts were established along

Looking south over the settlement of Fort Fitzgerald, at the south end of Slave River portage road. H.B.C. buildings are on the left, hotel at right centre.



EXPLORATION AND SETTLEMENT OF MACKENZIE DISTRICT, N.W.T.

this great northern water route and a rich supply of furs was transported southward by a chain of rivers, lakes and portages to far-away Montreal.

Although Roderick McKenzie traded during the winter of 1790 at the outlet of Great Slave Lake, the first buildings on Mackenzie River were erected in 1796 on the north shore, a short distance west of Trout River. The post was, however, abandoned in 1799, when the trader, Livingstone, followed Mackenzie's route to the ocean and was murdered by Eskimo.⁽⁴⁾

Short-lived posts were opened on the west side of Great Bear Lake (1799), and opposite the mouth of the North Nahanni River (1800). More permanent posts were established during the following decade at Fort Simpson, Moose Island, Great Bear Lake, Fort Good Hope and Fort Norman.⁽⁵⁾

Mackenzie District thus had about a half-dozen widely scattered trading-posts when John Franklin of the British Navy entered the area in 1820 on the first of his great overland expeditions to the Arctic Coast. This was the period in history when the British Admiralty began its intensive programme of exploration through the Arctic Islands from Baffin Bay. Franklin's purpose was to explore and map the south shore of the Polar Sea, and, if possible, to help Parry's sea expedition which was sailing westward looking for a through-passage between the northern islands.⁽⁶⁾

Franklin and his party, which included such later-famous names as John Richardson

and George Back, ascended Yellowknife River and built their winter quarters, called Fort Enterprise, on Snare River. In mid-June, 1821, the expedition left the fort and descended the rough and rapid Coppermine River. The Indian guides left them at Bloody Falls because of fear of the Eskimo, but the party continued with two brave Eskimo interpreters brought from Churchill for that purpose.

Franklin's expedition left the mouth of the Coppermine in mid-July in two birch-bark canoes which were continually stopped and almost crushed by the ice which filled Coronation Gulf. They charted the south coast of the Gulf as far as Kent Peninsula and explored to the head of Bathurst Inlet. On their return, because of scanty provisions and the approach of winter, Franklin chose to cross overland west of Bathurst Inlet to the head of the Coppermine.

The story of their straggling return over the uninhabited tundra is one of the epics of hardship and privation in Arctic literature.⁽⁷⁾ For weeks they lived on lichens and were reduced to eating deer skins. Several of the party died. Back went on ahead and in early November, near Fort Providence, finally located some Indians who sent meat back to the starved expedition at Fort Enterprise. In mid-December the unfortunate explorers were taken to Fort Resolution, where they spent the rest of the winter of 1821-22.

Franklin's second expedition of 1825-27, profiting by the experiences of the first one,

Looking south over part of the Fort McPherson settlement, with Anglican Church on the right, Indian cabins on the left.





Panorama of Fort Resolution, looking north from the H.B.C. buildings. Note the public Mission

made arrangements with the Hudson's Bay Company to be kept in supplies.⁽⁸⁾ P. W. Dease, a chief factor of the Company, was sent to Great Bear Lake in July, 1825, to open a post called Fort Franklin, near the site of the old North West Company post. In August Franklin and E. N. Kendall made a preliminary survey of the Mackenzie Delta. In the meantime, Back had joined Richardson at Great Bear Lake, and the two of them charted its shores.

In early September the entire expedition of 50 persons assembled at Fort Franklin and spent the winter there in comparative comfort. The following April, Richardson and Kendall completed the survey of Great Bear Lake. Following break-up of the ice on June 21, 1826, the party descended to the Mackenzie Delta and divided into two groups. Franklin and Back explored the Arctic Coast to the westward, after escaping from a large band of excited Eskimo who planned to kill them. They were continually hindered and delayed by fog and heavy ice which pushed southward. By keeping close to the shore in its two boats the expedition was able to chart 374 miles of coastline. Little did Franklin know that when he decided to turn back he was only 160 miles from an advance party of F. W. Beechey which had progressed eastward along the northwestern Alaskan Coast. The junction of the two expeditions would have completed the map-

ping of the northwest coast of the continent.

Richardson and Kendall travelled eastward and had somewhat similar difficulties, being troubled by shallow water, ice, gales, fog, and mosquitoes. They were able to complete their mapping, however, proceeding through Dolphin and Union Strait (named after their two boats), from where they reported new land to the northward (Victoria Island). The expedition walked up the west bank of the Coppermine, crossing to Great Bear Lake via Dease River.

The two groups were united at Fort Franklin in the autumn. Franklin stayed until February, 1827, and then completed the first overland winter trip for a white man southward from Great Bear Lake to Fort Simpson. (See map of exploration routes on page 248.)

With the completion of the two Franklin expeditions the northern coast of the continent was charted from near Point Barrow, Alaska, eastward to Kent Peninsula, and the earlier explorations of Mackenzie and Hearne on the two main rivers were confirmed. Thus, within a period of 30 years, Canada's two largest fresh-water lakes were roughly mapped, the courses of the two chief rivers of Mackenzie District known, and a few scattered trading-posts housed permanent white residents. Except for Indian accounts, however, little was known about the character and resources of the country away from the main water routes.

Aerial view of Fort Resolution, looking north from the H.B.C. buildings. Note the public Mission and wide residence



the Anglican Mission Church, hospital and school on the right, and the tennis court on the left.

When the news reached England that Sir John Ross' expedition to the Eastern Arctic was frozen in on Boothia Peninsula,⁽⁶⁾ and might soon need help, George Back volunteered to lead an overland rescue party to this section of the Arctic Coast. He arrived at the eastern end of Great Slave Lake in August, 1833, and crossed overland to Aylmer Lake. Back discovered a short, low portage to the source of Great Fish (now Back) River, and followed it for a short distance to ascertain its direction. His expedition then returned to quarters at Fort Reliance, where they passed a difficult winter, often lacking food.⁽⁹⁾

In April, 1834, Back received news that Ross had arrived safely in England, but decided to continue the expedition and map part of the unexplored Arctic Coast. Back

and his crew started in mid-June, using a novel method of pushing their boat on runners over the ice of the lakes and rivers to the source of Back River. After being delayed by ice during late July in Pelly and Franklin Lakes, they paddled to the mouth of the river to find the sea completely filled with ice-floes. Back spent several helpless days on Montreal Island in Chantrey Inlet, mapping only to the western entrance of the Inlet. In mid-August he started the return trip to Fort Reliance, which was abandoned later in March, 1835.

Back's expedition, covering a large section of the unknown interior, also located one more point on the map of the northern mainland. The final blanks were filled in by Thomas Simpson of the Hudson's Bay Company in 1837-39.⁽¹⁰⁾

Aerial view of Fort Smith settlement, looking north at Slave River. Note the street pattern and wide scattering of residences.





Group of pictures showing Mackenzie Valley Indians:—

*Extreme left:—
Indian boy with a slice of bread and butter at Fort Good Hope*

*Left:—
Two Indian girls at Arctic Red River*

*Bottom left:—
A group of Indian boys at Arctic Red River*

*Below:—
An Indian family at Fort McPherson*



Simpson and P. W. Dease travelled westward from the Mackenzie Delta in 1837, and, despite having trouble with ice, were able to make better progress than Franklin's previous expedition. Their boats, however, were finally stopped by heavy floes near Point Barrow, and Simpson decided to walk the short remaining distance. Fortunately, he was soon picked up by an Eskimo boat, and reached the most northerly point of Alaska on August 4. Simpson's mapping thus completed the outline of the northwestern mainland of the continent. The successful expedition returned to its winter quarters on eastern Great Bear Lake in late September, planning to explore east-

ward the next year. The name of its group of buildings, Fort Confidence, was typical of those used by earlier expeditions.

In 1838 Simpson and Dease reached the western end of Kent Peninsula, near Franklin's most easterly point, but were held up for ten days by gales which packed the ice against the low shores. Finally, Simpson again decided to explore on foot. From the eastern end of Kent Peninsula he could see the unexplored land-mass of Victoria Island to the north and open sea to the eastward. On his return to the boats, however, Dease and the men believed that it was too late in the season to continue.

Unfortunately, many years were to pass

EXPLORATION AND SETTLEMENT OF MACKENZIE DISTRICT, N.W.T.

before explorers realized that late August and September were the best months to navigate the Arctic Coast. Since winter was beginning on the land by mid-September, expedition leaders always had to worry about their safe return to winter quarters before this time. It was strange that Hearne's method of living and travelling with the natives was not used again for several decades. Explorers continued to wear their impractical European clothing and to carry most of their food.

After wintering at Fort Confidence, Simpson and Dease returned to the Arctic Coast in 1839. Although there was loose ice in Coronation Gulf, the explorers were persistent and worked eastward past Kent Peninsula. They mapped the unexplored shore of Queen Maud Gulf, finally linking up with Back's work of 1834. Simpson wished to continue eastward of Chantrey Inlet to see if the land to the north (now King William Island) was connected with the mainland of Boothia Peninsula, but Dease soon decided that they must turn back. On the return trip the expedition traced parts of the south shores of King William Island and Victoria Island. The journeys of Simpson are among the longest performed in small boats in the Arctic. With his work, the earlier explorations were all linked and the northern coast of America was mapped from Boothia Peninsula to Alaska.

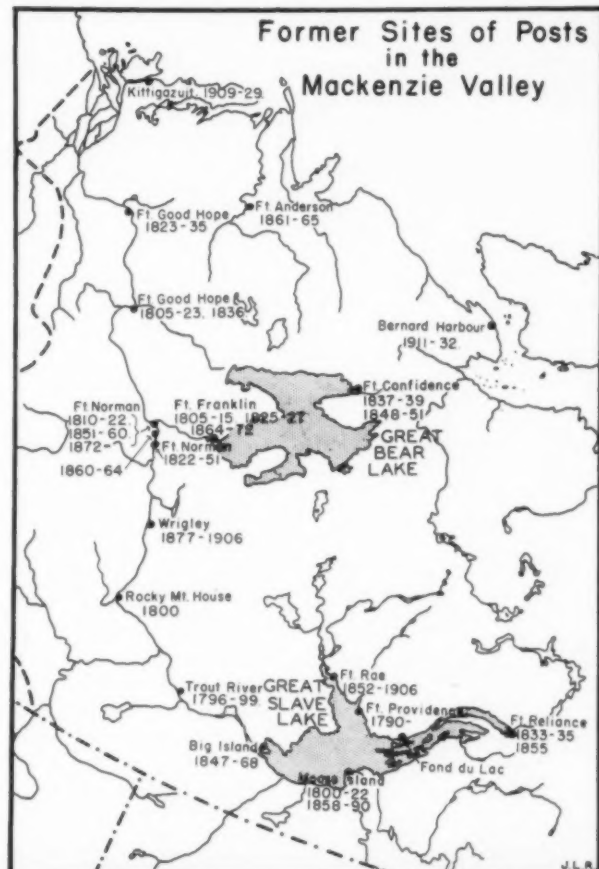
Much of the success of these early pioneer journeys was due to the type of shallow-draft boat used, and to the sheer manual labour of the French-Canadian and British boatmen, who rowed and hauled their frail craft through ice-floes and over shoals. The mapping of the western Arctic Coast should be considered in connection with the whole programme of Arctic exploration. The latter included numerous sea voyages into the Eastern Arctic. (6) The overland and coastal journeys in Mackenzie District were actually delimiting the southern line for those seeking a northwest passage from the east.

Other expeditions entered Mackenzie District in the following decades, chiefly aiding

in the widely publicized search for Franklin, but they generally followed the previously known routes. Among the latter were the journeys of Richardson and John Rae west of the Mackenzie Delta in 1848, and the completion of the mapping of the south coast of Victoria Island by Rae in 1851. On the mainland, one of the most notable trips was that made by J. Anderson and J. Stewart of the Hudson's Bay Company down Back River to its mouth in 1855.

The success of the first exploratory expeditions must be credited partially to the fact that there were several trading-posts established in the region. These centres, with their connecting transportation systems, were used as bases of supply and were available as a retreat in case of winter difficulties. During the exploratory period the location of the posts changed several times, and new ones were gradually added to give wider contact with the Indians. (See the accompanying map of former post sites.)

Since the early post factors had to depend a great deal upon the resources of the country





Left—The Church of England mission buildings at Aklavik, with church on the left, hospital in centre and residential school on the right.

Below—The old original Roman Catholic mission buildings erected at Fort Providence in 1862. The church on the right was still standing in 1945.

Bureau of N.W.T. & Y.A. photo, taken in 1925

to augment their scanty provisions, one of the primary considerations in locating a post was nearness to good fishing or hunting grounds. In addition, good fishing sites were frequented by the Indians and were thus centres to which they would assemble, bringing in their winter's fur catch. By 1852 there were eight trading-posts scattered along the main waterway, served by annual York boat brigades. The only white residents in the region were those who handled the fur trade or were associated with it.

Missionary Activity, 1852-1900

After the middle of the nineteenth century changes came to the Canadian Northwest. As was typical of the history of pioneering, missionaries followed the traders. Their mission churches and houses, and later their schools and hospitals, gave a greater degree of permanency to the post settlements.

In 1852 Father Faraud of the Roman Catholic Mission at Fort Chipewyan visited Fort Resolution. In 1858 two missionaries entered the area to establish permanent centres. Father P. Grollier came to Moose Island, near Fort Resolution, where a mission had been established by Father Eynard in the spring. (11) In the same year Archdeacon Hunter of the Church of England resigned his charge at Red River and accompanied one of the Hudson's Bay Company brigades north to Fort Simpson. Next summer Rev. William Kirkby replaced Hunter at Fort Simpson and built the first church and dwelling there. Also, in 1859 Father Grollier accompanied the Hudson's Bay Company brigade as far north as Fort Good Hope, near which he built a mission at the mouth of Hare Indian River.

During the following years much of the work of the missionaries was accomplished



by long patrols and visits during both summer and winter. Many of their "missions" did not have permanent residents or buildings until several years later. Gradually, however, churches were erected, adding to the size of the tiny posts. In the history of missionary activity in Mackenzie District there are many men who performed long and faithful service for their cause under primitive conditions very different from those of present life in the Valley. In the field of exploration and travel, two missionaries were outstanding among their brethren — Bishop Bompas and Father Petitot.

Rev. W. C. Bompas arrived at Fort Simpson in 1865 to assist Mr. Kirkby with the Anglican missions. In 1866 it was agreed that Bompas would be given a roving commission. During the next few years he travelled widely throughout the region from the Peace River area to the Arctic Coast. During 1870, for example, his travels exceeded 4,000 miles, either by canoe or snowshoes—distances which had never been attempted by anyone previously in such a

short period. ⁽¹²⁾ In 1874 Mr. Bompas was made Bishop of the newly formed Diocese of Athabaska, and established his headquarters at Fort Simpson. In the succeeding years he continued his wide travels among the Indians until transferred to the Yukon in 1891.

Father Emile Petitot was one of the priests who helped to build the Providence Mission in 1862. Three years later he was stationed at Fort Good Hope, and for the next decade travelled extensively in the Great Bear Lake area. ⁽¹³⁾ He mapped much of the area around Lake Colville, and even penetrated into Eskimo country almost to the mouth of Anderson River. Credit is due to Father Petitot, not only for his missionary work, but also for being one of the notable explorers in the north-central part of Mackenzie District. His several books on geography, ethnology and travel comprise a valuable contribution to our knowledge of the character of this region.

The exploits of these two missionaries typify the work which was being done by the two churches in the District. With their coming more buildings were added to the small posts, and when the Indians also started to build summer cabins near the missions, the nuclei of settlements took shape. During the last part of the nine-

Alexandra Falls on Hay River; this striking waterfall was named by Bishop Bompas during his extensive travels in 1872. Note the present winter road to the right of the river.

Photo by K. Perry

teenth century missions were opened at every post throughout the District from Fort Smith to Herschel Island, completing the first major advance in settlement growth. Since new trading-posts were also opened during this period, there was, in 1900, a line of thirteen settlements throughout the Mackenzie Valley, connected by steamer transportation.

(PART II of this article will appear in the July issue of the Journal.)

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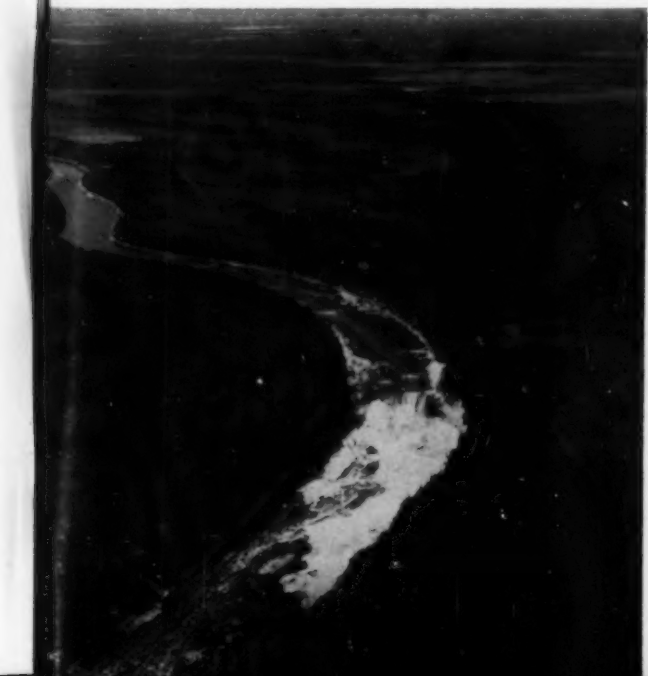
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*For those readers interested in early history and exploration the authors recommend the original journals of the explorers.

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At top:—Pegwell Bay, viewed from Ebbsfleet, with Ramsgate in the distance



Above:—Kingsgate Castle and North Foreland Lighthouse, Broadstairs

British Council photos

The Isle of Thanet

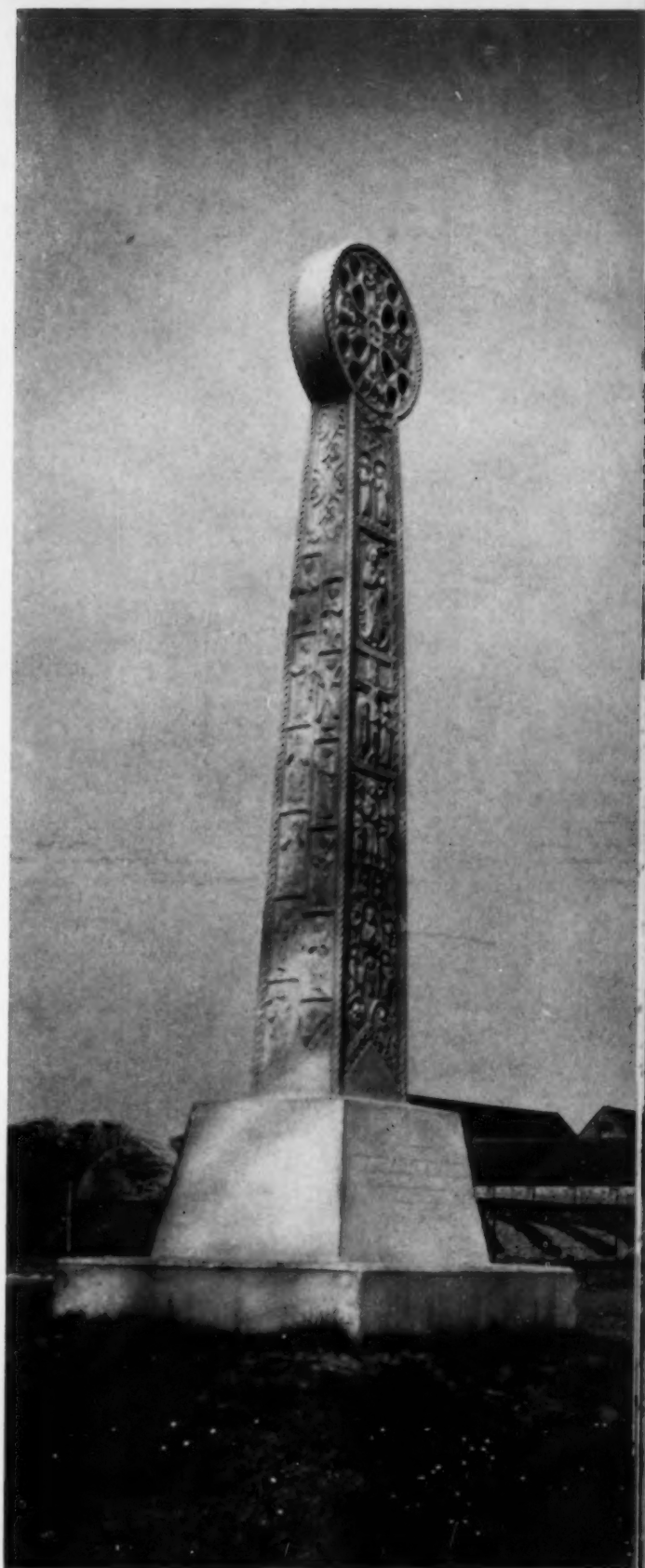
by W. H. CORKILL

MANY CANADIANS serving in "Hell-Fire Corner" during the war wondered why the district bears the name of the Isle of Thanet. Modern highways have camouflaged the geographical division, but until about two centuries ago Thanet was separated from the mainland of England by water.

Originally England was part of Europe, for a narrow strip of land divided the North Sea from what is now the English Channel. This isthmus was worn away at the end of an ice age, and Britain became an island. In those days an arm of the sea a mile wide cut Thanet off from Britain, and ships were sailed into the heart of what is now the Cathedral City of Canterbury. Silt from the Kentish anticline and erosion of Thanet's chalk cliffs by the sea combined to close this gap, and by Roman times the rivers Wansum and Stour had usurped the bed of the ancient strait.

Long before the Romans came, the men of Thanet traded with the Gauls on the continent, ferrying their corn, cattle, gold, silver, iron and dogs across the Channel in ships of considerable size. Like good traders they gave material help to their customers when the steel-gloved hand of Rome stretched northward, and thus they attracted Caesar to Britain. The legions landed near Ebbsfleet, but the sea fought on the side of the British, and Caesar retired after a three weeks' stay. His forces returned, however, in 54 B.C. and captured Durovernum (now Canterbury), but his stay was short; once more the inimical sea had battered his craft.

St. Augustine's Cross, Ebbsfleet
British Council photo





THE ISLE OF THANET

Claudius led his legions to nearby Sandwich in A.D. 43, and Rome gradually extended her rule over Britain. Thanet resisted successfully for many years, even though Romans were garrisoned at Richborough and Reculver at the sea-ends of the water-gap to keep watch on Tanatus Insula.

Roman despotism crushed local independence and vigour in almost every province of the Empire, and when the Romans withdrew their legions Britain was left an easy prey to the Picts from the north, pirates from Ireland, and the Angle Confederacy from Jutland. Setting thieves to catch thieves, the British offered land and pay to the Angles as an inducement to drive away the Pict and Irish invaders.

English history really begins with the landing of Hengist and Horsa in A.D. 449, again at Ebbsfleet. They scattered their piratical competitors and, when the natives unwisely haggled over payment, helped themselves to all the land they desired. Thus, much of Britain became Angle-land, and the tongues and laws of the country became English.

St. Augustine and his monks landed at Ebbsfleet in A.D. 597 and marched to Canterbury. The church prospered and, as time passed, the monks reclaimed marsh after

marsh in Kent and raised religious houses, including a minster in Thanet. The island was divided into ecclesiastical parishes, and churches were erected. These were small structures, enlarged by Norman and later builders, but they were the centres of social life round or near which communities developed.

The sea has receded considerably since Augustine's day, and sheep graze on the golf-links covering the historic landing-place. Away to the east chalk cliffs sweep past Pegwell Bay on to Ramsgate; southward lie Sandwich and Richborough (a Roman fortress now in ruins); and afar, hidden in the blue haze, lies Deal. Beside the golf-links, where Canadians camped and kept guard during the war, stands a Celtic cross. On this very spot, we are told, Augustine paused to preach to Ethelbert, King of Kent and his Frankish wife Bertha. If the day is fine we can look from the chalk cliffs across the marshes and see the towers of Augustine's memorial, Canterbury Cathedral. With a little imagination we can see the ships which sailed across this district until near the close of the thirteenth century. Much land has been reclaimed for farm and pasture since those days.

A short walk from Ebbsfleet brings us to Minster, a quiet little Kentish village which

Top left:—Ramsgate, looking west

Sunbeam Photo Ltd., Thanet

Left:—Ramsgate Harbour

British Council photo

Right: — St. Lawrence Church, Ramsgate

Sunbeam Photo Ltd., Thanet



Right:—The main bay, Broadstairs

Sunbeam Photo Ltd., Margate

Below:—St. Mildred's Bay (Westgate-on-Sea) from the east

Sunbeam Photo Ltd., Margate



retains the charm of the nineteenth century and keeps the turmoil of the modern world from its streets. Here there are countless trees, a reminder that Thanet was covered with trees in Roman days. But apart from this small corner, the trees have been removed from the Island, a chalk tableland some five miles wide and nine miles long.

The village takes its name from Minstre, the church, a building steeped in history. Indeed, some Roman bricks near the base of the tower have been regarded as vestiges of a pre-Christian temple. Part of the church is Saxon, the tower and nave are Norman, and the chancel is Early English. Across the road from the church is Minster Abbey, a

private building embracing the remains of an ancient nunnery. Small wonder that Minster is frequented by historians, antiquarians and pilgrims to Augustine's cross from many countries.

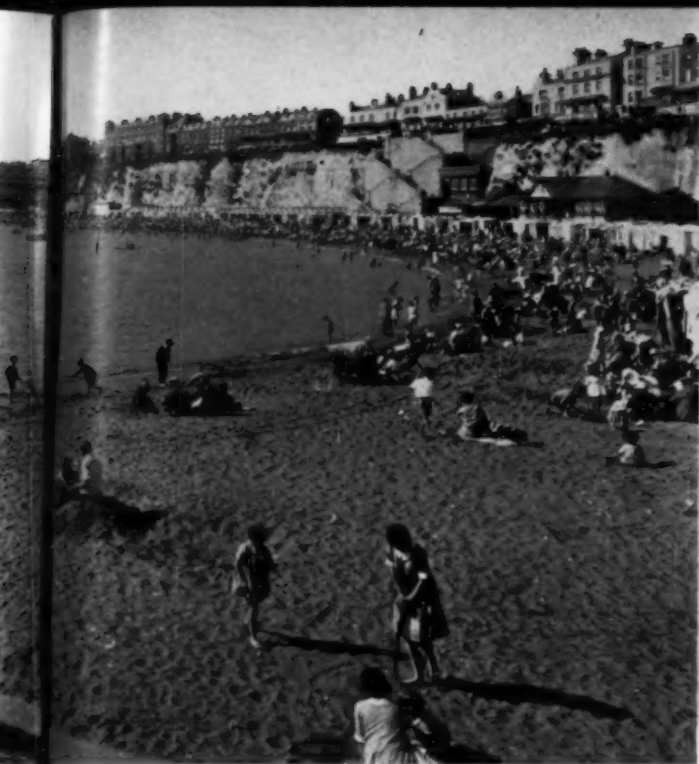
When Minster was a place of importance, Ramsgate was a tiny fishing hamlet; in Elizabethan days it contained only 25 houses. Approaching from the south, one sees the chalk cliffs of Pegwell Bay. They form an abrupt edge, varying from 75 to 150 feet in height, to a tableland inaccessible from the sea except by gaps—or "gates". The British name for Thanet was Ruim, and Ramsgate was "the gate of Ruim". The real Ramsgate, however, centred round the



Foreness Bay, Margate

Sunbeam Photo Ltd.,
Margate

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Below:—Westbrook Sands; Margate Harbour in distance

Sunbeam Photo Ltd., Margate



Church of St. Lawrence about one mile from the shore. This is a Norman building of great beauty, and it was the parish church of Ramsgate up to the opening of this century.

Ramsgate did not assume importance and size until the eighteenth century. Throughout the ages, the north of Thanet, in common with the south coast of the Thames Estuary, has been attacked by fierce N.E. gales, and storms have devoured the friable soils. The detritus has been carried away, much of it to be deposited on the dreaded Goodwin Sands and the Downs east of Thanet. A harbour of refuge for craft using the Downs was required, and one was built at Ramsgate. Town and harbour developed rapidly, thanks

to the timber trade with Baltic and Scandinavian ports. King George IV conferred the title of Regis on the port, and almost at once it rose to fame as a watering place.

Ramsgate played a prominent part in the last two wars. From 1914 to 1918, the harbour was a subsidiary port for the famous Dover Patrol of the Royal Navy, and thousands of Canadian soldiers were nursed to health in the town. In 1939 the harbour became a naval base and the headquarters of Contraband Control Port No. 1. Some 87,000 survivors were ferried from Dunkirk to Ramsgate. Light coastal motor-boats, including a Canadian flotilla, based on Ramsgate made the Thames Estuary and the

Louisa Bay (Broadstairs) showing Bleak House, the pier, and part of the main bay.

Sunbeam Photo Ltd.,
Margate





St. John's Church, Margate

Sunbeam Photo Ltd., Margate

Channel unhealthy for U-boat and E-boat alike. Radar stations close to the Borough were on continuous duty, warning the R.A.F. advance fighting post at Manston, just behind Ramsgate, where Spitfire and Hurricane waited. Canadians played a prominent part in these radar stations and at Manston. Ramsgate suffered from enemy action, but the casualties were not very heavy, and to-day the Borough is speedily regaining its pre-war attributes and attractions.

Leaving Ramsgate by the Canterbury Road, we go through St. Lawrence, which still retains a flavour of yesterday, and proceed across an undulating tableland, for centuries noted for the excellence of its farming. Minster is passed, and descending a little-frequented by-road we reach the old-world village of Monkton with its small church of Norman and Early English architecture. Near the church are the village

stocks, in their days as salutary as any modern gaol. And round about are many fine old houses with notable histories, now employed as farmhouses. Two miles farther on lies the hamlet of Sarre, which also has its quota of distinguished old houses. Here in ancient days was the chief and shortest ferry between Thanet and "the Continent", as the old writers termed the mainland. Sarre is a treasure-house of English history, for here lived the de Avills, Wentworths and the Lords Howard of Effingham.

We cross from Thanet to "the Continent" by the causeway, and, turning north at the village of Upstreet, pass through the hamlet of Chislet with its squat Norman church and its Old Hall, to-day a farmhouse. Here the soil is clay and sandstone with none of the chalk of Thanet. Roundabout are old brick farmhouses, thatched roofs and old-world quietness, for we are in a backwater avoided

THE ISLE OF THANET

by modern traffic. Plover and lark, redshank and gull, finch and linnet, have little competition from horn and siren, and so they hold daily festival.

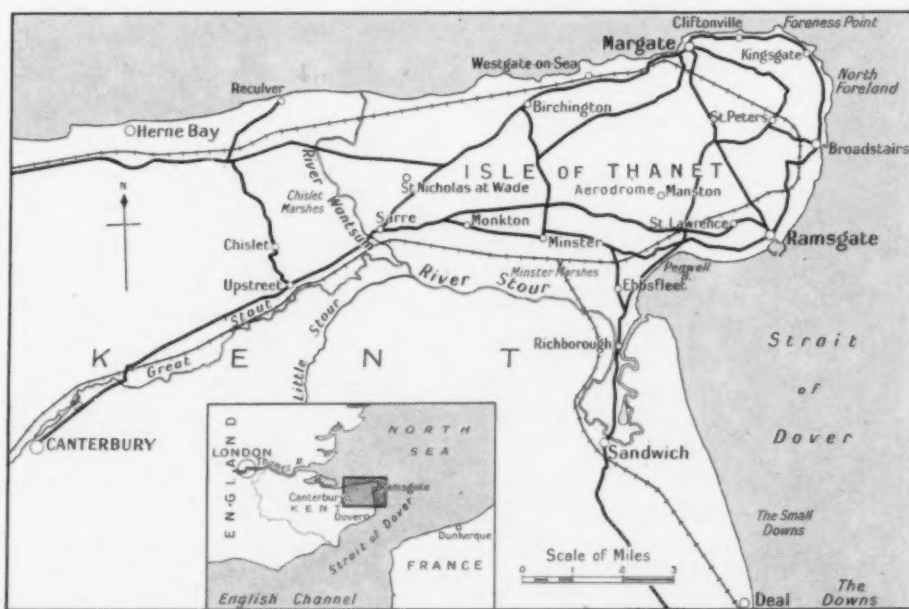
We arrive at Reculver; the ruins we see do not belong to the church known to the Roman soldiers as Regulbium, but to a later structure. It was a fine old Norman church, but when the sea encroached upon the hamlet and the church, attracting sightseers to whom the vicar's mother objected, the woman persuaded her son to pull down the edifice, and he obeyed her. The sea has devoured about one-half of the old Roman camp, but the south wall remains. Glancing at the few houses of Reculver, it is difficult to picture the place as a town of note; yet such it once was, for this was at one time the seat of Kentish kings.

Retracing our steps, we cross the river Wansum, and striking eastward come to the ancient village of St. Nicholas-at-Wade, which can have changed but little for centuries. A Norman church stands in the centre of the village, and round about are the one-time homes of famous Kentish families, but most of them are now farm-houses dotted among wide fenceless fields. Three miles beyond St. Nicholas lies Birchington, once a tiny village centred on a thirteenth-century chapel, but now a seaside resort popular as an all-year residential district. In bygone days Birchington con-

tributed ships and men to the defence of the realm, paying tribute to its superior port of Dover. Dante Gabriel Rossetti is buried in the churchyard.

Two miles beyond lies Westgate-on-Sea, without any ancient history but with a number of reputable schools. Less than a mile from the highway to Margate stands a medieval gateway flanked by four towers built of brick; this was part of the home of the influential Dandelion (Dent-de-Lion) family. To-day the gateway ornaments a farm.

Margate has grown round the ancient parish church of St. John, an edifice of plain exterior, but actually of Norman and Early English construction. It was enlarged from a chapel in the twelfth century, and has a lengthy nave. Between the church and the sea lies the town laid out in squares bordered by solidly constructed Georgian houses bearing witness to the popularity of Margate with rich and powerful London merchants of a century or two past. To-day Margate is a favourite holiday resort of Londoners, who flock here in thousands by road, rail and sea. The latter is a fitting means of arrival, for Margate, situated at the point where the Thames meets the North Sea, was in earlier days of much importance in the fishing and coastal shipping trades; and here it was that sea-bathing and bathing machines were introduced into Britain. Margate, with its



C.G.J. map



*North Foreland
Lighthouse, Broad-
stairs*

British Council photo



extensive beaches, is the oldest seaside resort of note in the land.

Leaving this town, by way of Cliftonville and Foreness Point, we arrive at Kingsgate Bay, an indentation in the tableland. Here stands an imposing battlemented castle, a beautifully proportioned building of no great antiquity but of much note as a select hotel. Half a mile south stands the conspicuous North Foreland lighthouse, a successor of bygone coal-burning beacons. Indeed the beacon light was provided by coal burned in an open grate until as late as 1893.

A short distance brings us to the spot of which Charles Dickens wrote: "This is a little fishing village, intensely quiet, built on a cliff whereon, in the centre of a tiny semi-circular bay, our house stands, the sea rolling and dashing under the windows. Seven miles out are the Goodwin Sands, where floating lights perpetually wink after

York Gate, Broadstairs
British Council photo

THE ISLE OF THANET

dark, as if carrying on intrigues with the servants."

That description may have been written in Bleak House, Dickens' House or the Albion Hotel, for Dickens stayed at all three places during his lengthy association with Broadstairs—the prettiest place in Thanet, in the opinion of many. Its story goes back to neolithic days, for prehistoric settlements have been uncovered within its boundaries. For many centuries it was merely a gate from the sea to St. Peter's in Thanet, about a mile and a half inland. Here, in country seclusion, stood a chapel built by the monks of Canterbury, and round it were gathered an almshouse and ancient residences, upon which modern buildings encroach hesitantly.

The inhabitants of St. Peter's were not averse to discreet smuggling, and they used a gap in the cliffs to reach their ships. In time the small community of Bradstow arose near the gap, through which a roadway was made; a wooden pier was erected, and an arched portal with portcullis and gates, York Gate, was built to shut out aliens and privateersmen. Tiny craft sailed from Bradstow to Iceland and the Baltic, but to-day the mariners here are occupied with fishing and visitors. Broadstairs expanded until it united with St. Peter's under the government

of Broadstairs and St. Peter's Urban District Council.

Broadstairs has considerable fame as a health resort. More retiring and exclusive than Ramsgate and Margate, it enjoys a climate which has attracted important schools, homes and orphanages, chiefly on the outskirts, and it boasts well-designed residential areas. Wide open spaces surround the town, and winds from the North Sea keep the air fresh and clean, while the sun is a daily visitor throughout the year. Dickensians from all parts of the world come to visit Dicken's House, maintained exactly as the author left it. Many members of the R.C.A.F. are familiar with Broadstairs, for they served with the headquarters of an important radar wing housed on Lanthorne Road.

A few minutes' stroll along the sands brings us into Ramsgate, and to the end of our circular tour of Thanet. There have been many changes in the Island during the past one hundred years, largely on the coast. The farms have altered but little for centuries; but, as more light industries are attracted from overseas to Thanet because of its climate and its proximity to the large markets of Britain and the Continent, even the farms, like the sea, will steadily recede from its cliffs.

*Dickens' House,
Broadstairs*

Photo by Wards,
Broadstairs



Mapping A Hundred Years of Change in the Niagara Peninsula

by J. W. WATSON

THE NIAGARA PENINSULA is one of the most historic regions of Canada, and in surveying its development one can go back over two centuries of maps to the early efforts of the French explorers. Crude as the first maps were, they allow us to reconstruct the patterns of Indian settlement and of pioneer occupation.

We learn from them that Indian settlement was of two kinds—more or less permanent agricultural villages and irregular hunting camps. Agricultural implements being limited to the hoe, the villages were built in open coastal areas of light sandy-loam soil. There were no villages on the heavy interior clays with their dense vegetation of oak and soft maple. But these became the hunting grounds where, in the Welland and Grand River valleys, temporary camps were set up.

This simple pattern represents the essential physical contrasts in the region. (See Fig. 1.) For the Niagara Peninsula consists of strongly contrasted geological systems and land forms. Running throughout its length, from east to west, are alternate bands of soft shale and hard limestone. The Queenston shales to the north and the Marcellus shales in the south have been scooped out into the

basins of Lake Ontario and Lake Erie; while the Salina shales, in the valleys of Welland and the lower Grand, form a flat interior plain. Between these belts of less resistant rocks there rise the escarpments of harder limestone: the massive Niagara escarpment overlooking the Ontario coast, and the much lower and more broken Onondaga escarpment looking down on the Welland and Grand River valleys.

Glacial deposits emphasize the geological contrasts. (See Fig. 2.) As the ice advanced or retreated, its local movements were governed by the underlying topography. In particular, it seems to have thronged up the Dundas valley and Power Glen, and then spread out fanwise, so that in the districts around Ancaster and the Short Hills (Font-hill) the festoons of moraines which drape the dip-slope of the Niagara scarp are caught up into prominent knots of glacial hills.

Farther out on the dip-slope, the ice-front split up into great cracks, and deposited the oval mounds or drumlins in the Westover-Mountsberg and the Caledonia areas. Still farther south, the glacial deposits faded out under lacustrine ones as the melt-waters of

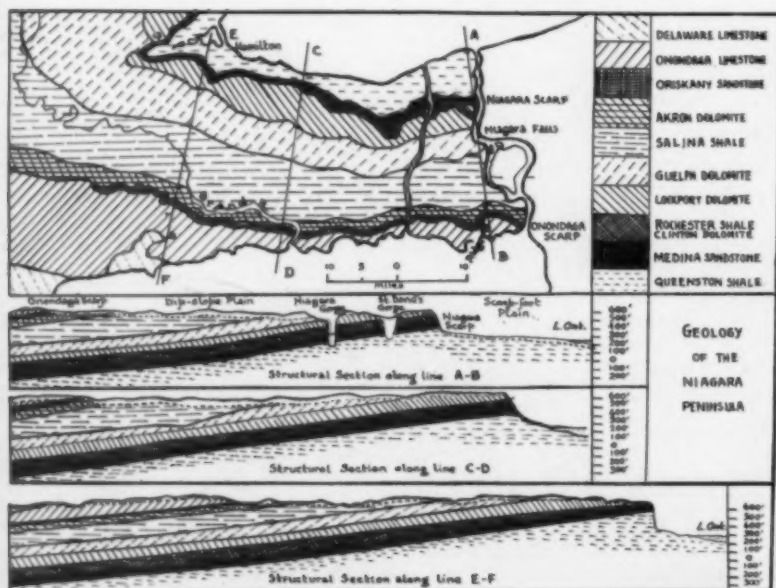


Fig. 1—Geology of the Niagara Peninsula. Note strong contrasts between the limestone escarpments, and the shale plains. The Clinton and Lockport formations make the Niagara escarpment. The Onondaga limestone stands out as a low scarp near Ridgeway and south of the lower Grand. The Salina shales floor the interior plains of the Welland and Grand Rivers. The outstanding contrast is between the scarp-foot plain, the Niagara escarpment and the dip-slope plain above it.

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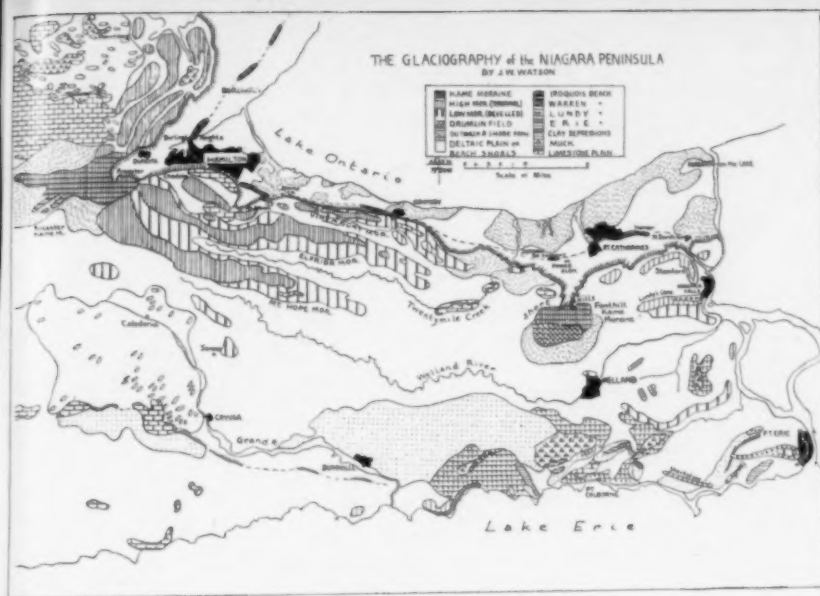


Fig. 2—Glaciography of the Niagara Peninsula. The ice stripped some parts of the Mountain top from their soil covering (the limestone plain) but deposited a great deal more material. Some of this was in the form of rolling moraines of boulder clay, along the crest of the escarpment; e.g., the Vine-mountain, Elfrida and Mt. Hope moraines. Some of the material was laid down in still waters in front of the ice, and was partially sorted, forming the sandy moraines of the Ancaster and Short Hill "kames". Some deposits were dumped in the form of elongated mounds or drumlins, as at Westover and Caledonia. Most of the Peninsula was under water when the ice-front retreated, and so beaches were cut or built up. Glacial Lakes Warren and Lundy, and the enlarged Lake Erie, left well-marked beach ridges on the dip-slope plain; Lake Iroquois, on the scarp-foot plain. Deltas spread into the lakes from the Grand River. Then, after the lakes subsided to their present levels, sands were washed out and spread over the plains, as at Ancaster and Fonthill, or along the shores in a number of little fans. Remnants of the higher lakes are left in the bogs of the dip-slope depression.

the ice streamed into glacial Lake Warren (that then occupied the Erie basin). Wide sheets of clay were spread over the interior Salina vale, while delta material from the Grand River added deposits of silty loam in the southwest. Finally, Lake Warren began to cut beaches into the earlier material, and sandy beaches were formed in the Fonthill district, along Lundy's Lane, and between Fort Erie, Ridgeway and Sherkstone. These beach ridges are important as the chief well-drained sandy-loam soils of the dip-slope

plain. Most of the soils of the interior are ill-drained clays or silty loams. The soils of the moraines festooning the brow of the Niagara scarp, and also of the drumlin hills, are well-drained clays, generally with stones and boulders in them. In the Fonthill and Ancaster regions, well-drained sandy loams are found on the hilly knots of kame moraine.

Below the "Mountain" (as the Niagara scarp is known locally) the retreat of the ice led to the formation of glacial Lake Iroquois (in the Ontario basin). This lake cut out and

Approaching the St. David's gorge. This aerial survey shows up clearly the three levels of relief facing Lake Ontario. To the south, a small part of the Niagara escarpment is revealed, at line A. The Queen Elizabeth Highway is about to climb the scarp by way of the St. David's re-entrant. The highway runs over the high-level terrace, or clay bench, which extends to line B. Notice how it is ravined, the many woods there, and the general type of farming that characterizes it. At B the Iroquois beach is found, followed by Number 8 Highway, or what used to be known as the Ridge Road. Finally, in the upper right is a portion of the low-level terrace, with many orchards and graperies.





The climb to the St. David's gorge. The Queen Elizabeth Highway is shown climbing up from the low-level terrace in the immediate foreground (note the grapery and orchard) to the Iroquois beach, where it joins the Ridge Road. After crossing the new ship canal, the two roads diverge. The Ridge Road runs through Homer along the edge of the beach ridge, whereas the main highway crosses the clay bench and enters the St. David's gorge. This gorge was partly the work of ice, and provides an easy way up the Niagara escarpment. Notice the pasture and fodder crops of the dairies and general farms of the clay bench, and the dense forests of the scarp.

built up a well-marked bench all along the foot of the scarp from Queenston to Burlington Heights. Below this, the old shore sloped away over a wide beach platform, which, as it was washed by the sweep of easterly storms, developed a marked trench

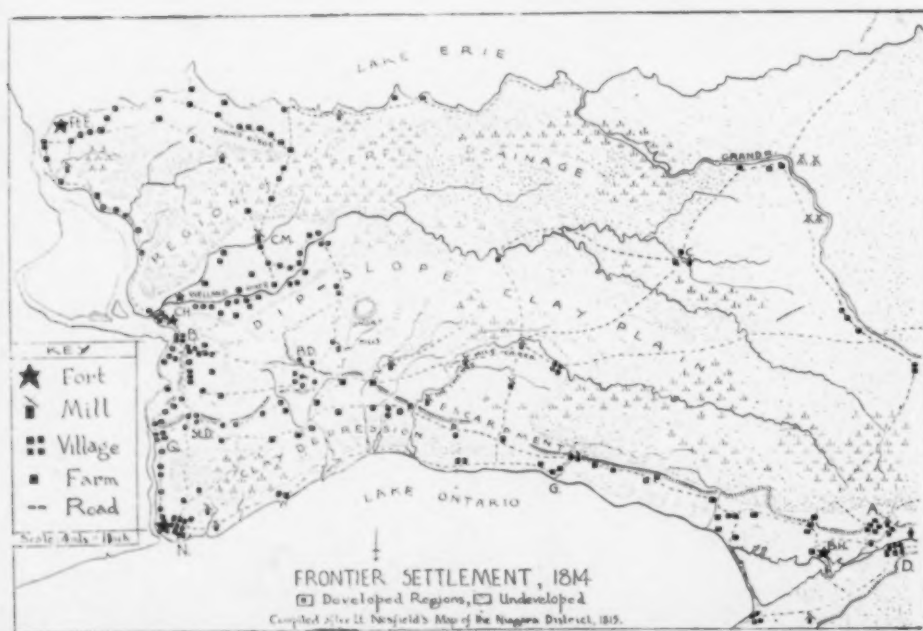


Fig. 3—Frontier settlement, 1814. This shows the Peninsula as it looked from Lake Ontario. (Lake Erie was not very important so far as settlement was concerned.) Most of the Loyalists had streamed out of the Mohawk valley, crossed the lower Niagara River, and followed the Ontario shore until they came up with another stream of Loyalists moving along the Dundas Road. Niagara-on-the-Lake, Queenston, St. David's, Burlington Heights and Dundas were the chief sites below the escarpment; above were Bridgeburg and Chippewa on the Portage Road, and Fort Erie on the upper Niagara River, together with tiny hamlets such as Cook's Mills, Beaver Dams and Ancaster. There was virtually no settlement on the dip-slope, away from the frontier zone; most of it was forest and marsh.



Grimsby; part of the narrow but very fertile and busy plain between Lake Ontario and the Niagara escarpment. This strip of lowland, left by the recession of glacial Lake Iroquois, forms the famous Niagara Fruit Belt. It is crowded with orchards, villages, towns and main thoroughfares, such as the Queen Elizabeth Way in the foreground. The soils consist of reddish clays, which have an unusually high iron content and are thus very suitable for grapes; and also sandy loams, ideal for canning crops and tree fruits, like cherries and peaches.

through its centre. The upper bench and the lower trench both have clay soils—the one, well-drained; the other, ill-drained. But the famous Iroquois beach that divides the two levels consists chiefly of gravel bars and sandy shoals, and consequently has supplied sheets of sand, which have been spread out over the Ontario plain. These are the Fruit-Belt soils.

When the pioneers entered the Niagara Peninsula, they looked for sites by the lakes, which would ensure them easy transportation; also open sand-loam soils that could be easily cleared, and creeks for their mills. Their chief settlements were ports near the edge of old glacial beaches. Beyond the lake shore and the river front the land was still a wilderness. (See Fig. 3.) This is evident from

A cross-section at Grimsby, showing the Niagara escarpment, the scarp-foot plain and part of the dip-slope plain. The scarp is gashed by profound and extremely picturesque gorges, and is densely wooded. The dip-slope plain shows some fruit farming along the very edge, but quickly gives way to dairy farming on the rolling clay topography. The scarp-foot plain is given over largely to fruit, though much space is taken up by settlement and communications.





St. Catharines and the old canal. Three distinct levels can be made out beyond the estuary of the Twelve Mile Creek, which is followed by the First Welland Canal. The highest level, (a), is formed by the cliffs of the Niagara escarpment; below this, at (b) is the Iroquois beach, on which most of St. Catharines is built (notice the church spires rising above the wooded bluffs of the beach ridge); finally, at (c) occurs the flat plain that formed the beach platform of glacial Lake Iroquois, and now slopes into Lake Ontario. Note how the factories and working quarters are competing with fruit farms for the low-level terrace.

Lieutenant Nesfield's map of the Niagara district, 1815, and from Gourlay's gazetteer, 1818, which reveal the value of the Warren beaches west of Fort Erie (along the Garrison Road); and also west of Niagara Falls (along Lundy's Lane); and again at the Short Hills, Fonthill. Similarly, the Iroquois beach was prominent from Queenston through St. David's to Shipman's Corners (St. Catharines), Grimsby and Burlington Heights (Hamilton). But settlement was slow to conquer the heavy soils of the glacial moraines above the Niagara escarpment and the still heavier ill-drained clays of the dip-slope vales.

However, the building of the Welland Canals between 1824 and 1845, and the sale of Indian lands from the Six Nations Reserve in the Grand River valley, led to a very rapid development of the interior, as seen from the maps of Chewett, Maitland and Stehelin. Meanwhile, the canal helped to drain the clay flats, methods of farming started to improve, the first plank roads made the interior accessible to the coastal towns, a market was beginning to spring up for wheat and pork, timber and hides; and so, by the middle of the century, the Niagara

Peninsula experienced a rapid increase in population and prosperity.

From this time on the statistical surveys made by individuals, commissions and the census, were adequate enough to give us a true picture of what was happening. Maps became correspondingly more efficient. It is to the last hundred years, therefore, that I should like to confine my attention.

To begin with, there is the excellent account of W. H. Smith, begun in 1846, of farming and settlement in Upper Canada. It was followed by Professor Buckland's description of Welland County in 1856, and by Page's Directory of the Peninsula in 1876. From 1871 onwards the decennial census is the best source of material, though the 1881 Report of the Ontario Agricultural Commission is invaluable. I myself have completed a survey of contemporary uses of land and types of settlement, which has furnished interesting contrasts with the earlier ones. This was done with the help of a grant from the Carnegie Corporation of New York, to which I am much indebted.

Geography begins with curiosity. It was Smith's keen inquisitive mind that led him

to compile the account from which we can reconstruct the geography of a hundred years ago. At that time, thirty townships were taken up by white settlers. Out of these, three were noted for their fruit production; twenty had enough grain to promote local milling; and seven were virtually homesteading or lumbering communities. The three fruit-growing townships were Niagara, which is freest from frost, and Pelham and Louth, where warm sandy-loam soils predominate. But no mention of fruit occurs for Stamford, Grantham, Grimsby, Saltfleet or Flamboro. Obviously, there was nothing like the Niagara Fruit Belt when Smith journeyed down the Peninsula. Indeed, even in the townships mentioned, wheat and barley fields were more prevalent than orchards.

Grain farming was common all along the sheltered scarp-foot plain, and also in the Short Hills, Lundy's Lane and the Garrison Road districts; that is, on the sandy soils washed out from the Iroquois and Warren beaches. But it was notably absent from the moraines above the scarp and from the interior vales. These were still covered by great forests, and were noted for their lumbering. In fact, Binbrook, which had no grist-mills, nevertheless supported three saw-mills. Today we would not think of it as a lumbering centre, but as a dairying township, growing much of its own grain.

The Dairy Belt, too, was quite undeveloped in the time that Smith wrote. Roads were few; towns were small. There were no large creameries. Trade consisted chiefly in wheat, barley, hay, pork and wool or hides. The economic circumstances did not encourage a more intensive use of the land. Therefore, the less accessible and the poorly drained areas in townships such as Binbrook, Wainfleet, Cayuga North and South, and Rainham were virtually untouched.

Some idea of the intensity of farming may be deduced from Smith's painstaking records of how much land was occupied and how much of this was cultivated. (See Fig. 4.) A map made from the results will show that the Head-of-the-Lake and the Niagara

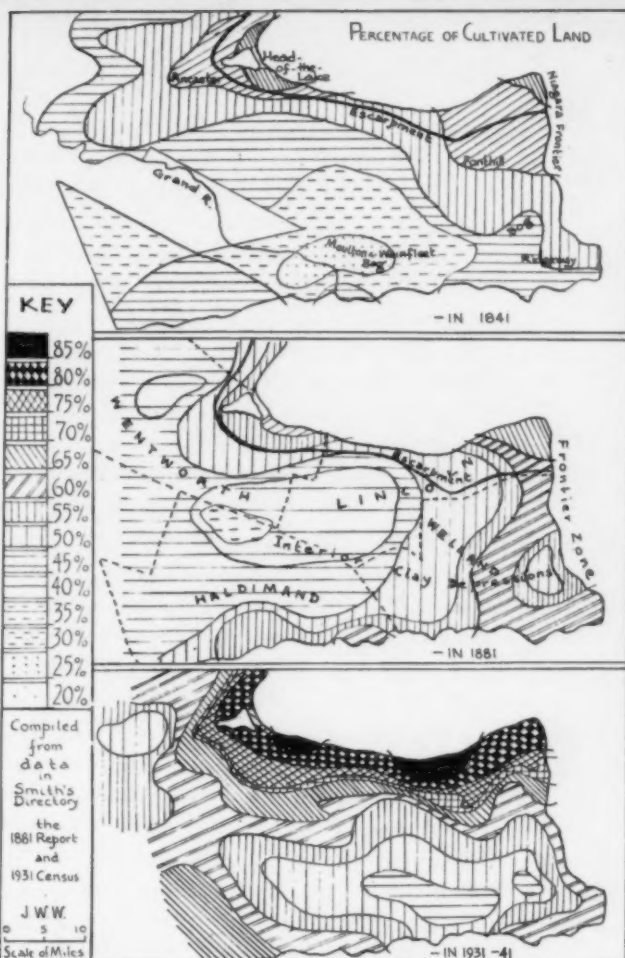


Fig. 4—A comparison of the use of land, 1841-1941. In 1841, the Niagara plain and the Head-of-the-Lake were the most intensively developed areas, and were strategically the most important. Next came the sandy-loam districts above the Mountain, including the Ancaster and Fonthill kamey areas and the Ridgeway beaches. But above the escarpment there was not very much cultivation. The Moulton, Wainfleet, Humberstone and Wil-loughby bogs in the Salina depression brought down the figures for cultivated land as low as 20 per cent. By 1881, intensive farming had spread to the canal zone and parts of the Erie shore as well as the scarp-foot plain and the outwash and beach-ridge areas on the dip-slope. But the interior clay depressions had still relatively little cultivation. The 1931 figures, and my later surveys (1946), show an extraordinary concentration of cultivation in the scarp-foot plain. It is also important to notice that some parts of the interior plains are not as well cultivated to-day as they were sixty years ago. The remarkable contrasts show up more clearly than ever the striking differences in land forms.

Frontier were the best developed regions, because they were the most accessible. They were followed by the Ancaster, Fonthill and Ridgeway areas, where the sandy-loam soils were easiest to work. Situation and soil were thus already important distinguishing factors in differentiating between farming belts. The regions with less than a third of their farms in cultivation were in the inaccessible,

ill-drained areas, where the moraines die away beneath flats of clay, and where no beach ridges break the monotony of the clay depressions. Also, very little cultivation occurred on the farms of the Grand River, which were remote from centres of trade and so were still left to the lumberman.

In 1856, ten years after Smith made his survey, Professor Buckland took a short tour through Welland County. He showed that farming was subordinate to lumbering. However, the canal had increased the volume of trade, roads had been built into the interior, and people were interested in foreign markets and improved husbandry. The most striking deficiencies in farming were the inferior breeds of stock, the small amount of fodder crops and the lack of draining.

As Professor Buckland left Merrittsville (the modern Welland), he climbed the rugged ascent from the wet clay plain to the higher and drier beach-ridge soils of the Short Hills—a large part of which was still under ravine and wood. He does not refer to Fonthill, though the famous nurseries had been established; but he mentions the fruit farms and nursery at Pelham, and the production of early potatoes. Then, descending the steeper face of the hills, where the Fonthill Golf Course lies to-day, he followed the brow of the Mountain, described Thorold as a coming place, noticed the strong clay soils (on the rolling moraine) and their suitability for wheat and clover, and referred to the raising of good breeds of cattle and sheep. Where the moraine bends south at Stamford, and has been altered by wave action to produce a sandy-loam soil over a stony-clay subsoil, he observed grain and root crops, improved pasture, and occasional herds of pure-bred Durhams.

Further south, as he climbed again to the ridge at Drummondville (on the Lundy beach), the heavy crops of barley impressed him. But the plains between Chippewa and Fort Erie are described as wet and weedy, in need of much deeper and cleaner cultivation. Climbing on to the Onondaga escarpment, and the loamy soils of the last Warren beaches, he found some excellent grain farms

around Ridgeway, with good quality fat cattle. However, the Willoughby, Humberstone and Wainfleet bogs kept farmers out of the southern townships, and there was little cultivation west of the canal. Sheep farming was the chief use made of these wet and weedy flats.

Such a survey, brief and patchy though it is, helps us to see how the use of land was changing in the Peninsula. Townships like Pelham, Stamford and Bertie, with their high beach ridges, their rolling moraines and their outwash sands, were definitely better cultivated than the interior townships of Crowland, Willoughby, Humberstone or Wainfleet, dominated by their ill-drained depressions.

Nevertheless, changes were slow. Page's Directory of 1876 shows remarkably few differences. Welland and Lincoln Counties offer the chief contrasts. Fruit farming was becoming more popular. Grantham and Clinton were singled out, in addition to Niagara, Pelham and Louth, as fruit districts, while at the village of Grimsby one of the largest apple orchards in the country had been developed. It is also significant that the western part of the scarp-foot plain, which is subject to severer and longer winters, went in for apples and pears, whereas the eastern part, with less danger from winter killing, had begun to experiment with cherries and peaches.

Yet we cannot say that a Fruit Belt had arisen, since in Grantham, where "apples, pears, peaches and the various berries do unusually well", fruit farming was still subordinate to grain growing and cattle rearing. For instance, there were no canneries at St. Catharines, but flour-milling and brewing were both very important. And at Grimsby, although there was a cider-press and winery, yet there were two flour-mills and a brewery, stressing the greater value of wheat and barley.

Similar changes were proceeding, though even more slowly, on the dip-slope plain, where population was increasing, and the better drained clays of the morainic ridges were being cultivated, as well as the beach ridges. Farming had at length ousted lumbering.

A more detailed record of changes in land use in Ontario was left us in the 1881 Report of the Ontario Agricultural Commission.

MAPPING A HUNDRED YEARS OF CHANGE IN THE NIAGARA PENINSULA

(See Fig. 4.) This is a veritable mine of information, and, although it lacks maps, we can nevertheless reconstruct a graphic representation from it. The counties of Lincoln and Wentworth, with their sheltered scarp-foot plain, their swelling moraines and fertile outwash plains, were the most intensively developed. Lincoln had 50 per cent of its cleared land under grain crops; Wentworth, 42 per cent. Of the crops in Lincoln, 35 per cent were grown as cash crops. They included fruits and berries, garden vegetables and sweet corn, as well as wheat and barley. Only 27 per cent of the crops in Wentworth were grown for sale; the rest went to feed cattle, pigs and sheep. For this was more a dairying country, since it had a larger market for milk and butter. At the same time, weather hazards were greater amongst its fruit and truck farmers.

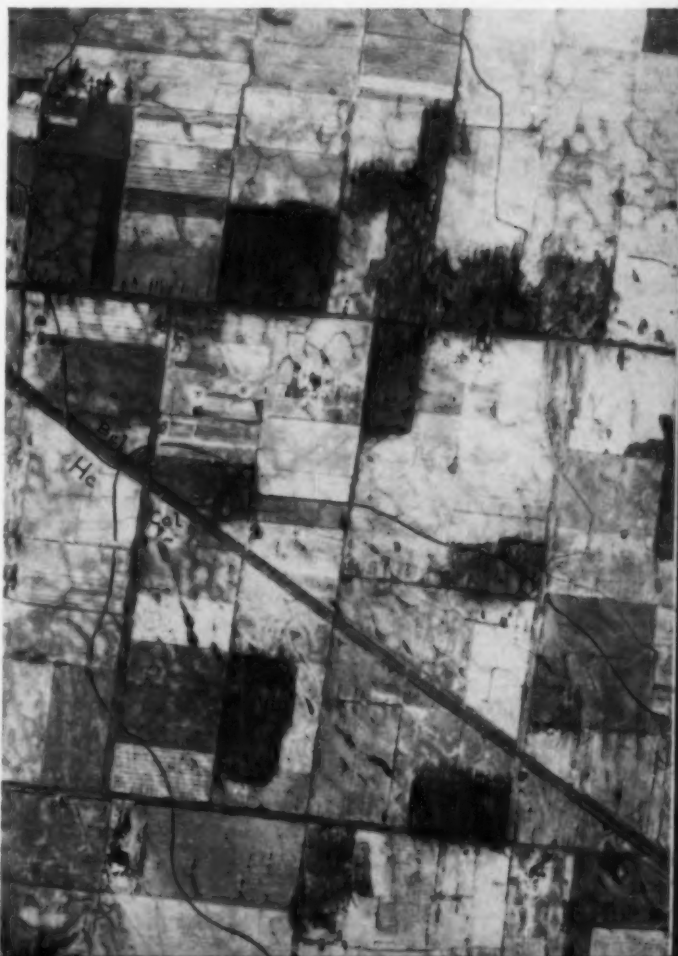
Welland and Haldimand Counties had slightly less land under cultivation (41 per cent and 39 per cent respectively) and the cash crops, which only made up between 24 per cent and 23 per cent of the total, were different. Instead of fruit, vegetables and corn predominating, fall wheat, peas, hay and potatoes were the most common. These crops are better suited to the widespread occurrence of clay soils, and better able to stand the severe winters and the variable frosts that make orchards and canning crops such a risk.

It is obvious that these differences between the counties, though quite real, were not striking. They did not exhibit any marked specialization. Yet conditions were

emerging which compelled things to change. For instance, the townships had reached what was to be their maximum population, and were really overpopulated. Thus Professor Hurd has pointed out that Haldimand County reached its maximum population in 1871. Yet the maximum number of farms was not reached until 1891. So competition for land approached a climax. At the same time, competition with outside regions had grown. American wheat, meat and fruit invaded the British market; farmers were trekking west to start the Prairie boom; while newer townships in western and northern Ontario were coming into competition and depressing the state of farming in the older frontier regions.

Consequently, we find signs that the uses of land had to show a continually closer dependence on their habitat. Just as situation and topography had dominated the earliest settlements, and then drainage and soil controlled the expansion of the middle nineteenth century, so towards the end of the century we see a gradual adjustment to the

A section of the Welland vale, part of the interior clay plains of the Niagara dip-slope. The Toronto, Hamilton and Buffalo Railway is approaching Welland, just south of the Fonthill area and north of the Welland River. The upper fields are relatively well-drained and well-cultivated; they are on the Berrien sandy-loam soils (Bel) which skirt the even more fertile Pelham sandy loams and Fonthill loams of the Fonthill fruit district. However, by the time the upper (twelfth) concession road is reached, the sandy-loam soils have become very shallow, and the clay substratum is close to the surface. Wet spots begin to appear in the fields, and much of the land is left to woods. The wet spots develop into streaks and small marshes in the lower centre, where, straddling the railway, is a patch of Caistor clay-loam (Ccl), which is very flat and naturally ill-drained. It is full of weedy pasture and woods of soft maple and swamp oak. Deterioration spreads from it to the surrounding territory. In the lower left, however, the influence of the Welland River is being felt in the better-drained Haldimand clays (Hc), where again the fields can be cultivated to a greater extent.



finer divisions of climate. At length, the scarp-foot plain became distinguished from the dip-slope plain on climatic as well as topographic grounds. At the same time, differences were revealed between the eastern "maritime" part of the Peninsula, and the western landward part.

As one would expect, the lofty Niagara escarpment helps to protect the scarp-foot plain from the cold waves of air that sweep eastward over Ontario in the winter, and also from many of the rain-storms that drive into the St. Lawrence valley. Consequently the scarp-foot plain, with an average winter temperature of 27°F. , is somewhat milder than the dip-slope plain above the escarpment, with an average of 24.2° . Average figures for the winter months, however, are not as telling as the extremes. Here we find that the extreme minimum for the scarp-foot plain is -16°F. , as compared with -34° for the interior vales. It is no wonder that there is much less winter killing of fruit, grain and pasture below the Mountain than above. In fact, the Fruit Belt is one of the most protected regions of Canada, and does not have the same risk as its chief Ontario rival, Leamington, where a low of -20°F. has been recorded.

Summers below the scarp are also a little warmer, with clearer skies and more sunshine. They are drier too, with 2.29 inches of rain at St. Catharines, and favour the mellowing of fruit. The interior plains have at least another inch of summer rain, and are rather more fit for dairy farming. Then, too, summers last longer beneath the scarp. The scarp-foot plain has an average growing season of 163 days, as compared with 148 days on the dip-slope. This is largely due to the prolonged autumn season and the protection from frosts offered by the Mountain. Quite often the frosts that do come are less severe, because they drain away over the steep slopes of the scarp and bench topography, whereas in the interior they linger on and become intensified in "frost hollows".

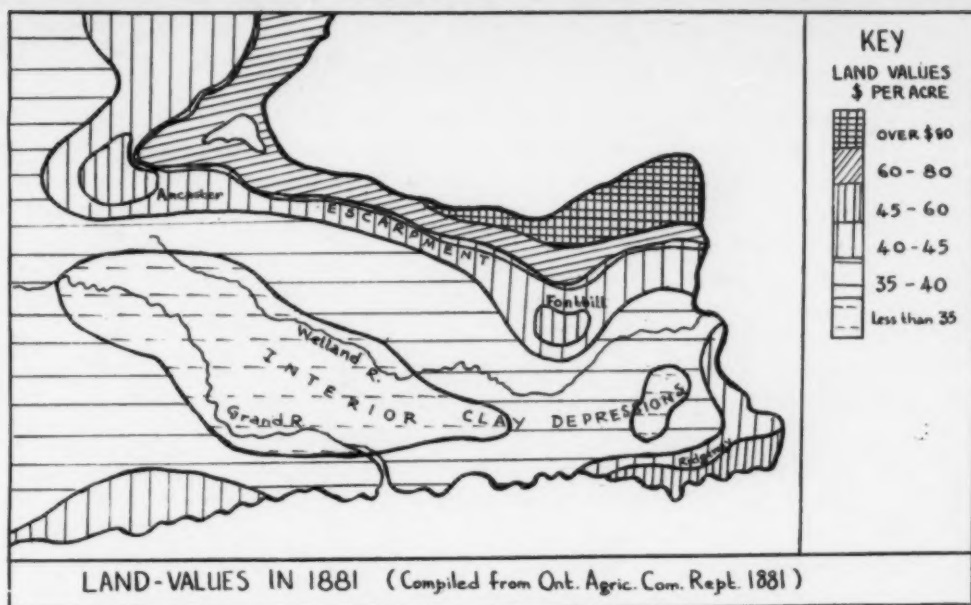
In addition to such major differences above and below the Niagara scarp, there are also important differences between the

eastern part of the Peninsula, only 25 miles wide, and the western part, which widens out into the land mass of central Ontario. Take the scarp-foot plain, for example. It is not a single unit; it can be divided at Grimsby into an eastern, more equable region, centred on St. Catharines, and a western, more extreme one, round Hamilton. Thus, the mean temperature of St. Catharines is 49.5°F. , while that of Hamilton is 47.8° . What is more important, the winter temperature at St. Catharines is 29.2° ; at Hamilton it is 24° . Moreover, the lowest temperature recorded at St. Catharines is -11° , which is not cold enough to kill fruit trees; that at Hamilton is -16° , which is sufficiently cold to do so. Spring frosts retreat two or three days sooner in the east, and fall frosts are delayed for six days longer. Thus, there is a longer growing season. (Indeed, at Vineland the season is as long as 183 days. But at Stoney Creek, in the western plain, it is only 154 days. This is a considerable difference when measured in terms of security for fruit farmers.) Similarly, the western plain differs in being a little wetter (30.03 inches of rainfall) with more cloud and less sunshine as compared with the east (28.74 inches).

Such were the minute differences that the specialized and more competitive farming of modern times began to expose and to exploit. The adjustment to climate was, of course, very slow, because the contrasts in climate were much smaller than those in relief or soil. Even in 1881 the contrasts were beginning to be apparent. We can summarize them in a map made from the 1881 land values. (See Fig. 5.) The scarp-foot plain stands out clearly, with by far the highest average value of land, amounting to \$70 an acre. Yet the soils of the scarp-foot zone were no better than many above the Mountain; nor was this zone so very much more accessible. People were paying these high prices for climate. Compare them with \$42.50 for the moraines of the Mountain brow, or \$41.50 for the beach ridges of the Erie plain; or \$32.50 for the interior vales.

Yet even on the dip-slope plain, the differences were large enough to be signif-

Fig. 5—Land values in 1881. The highest values were in the most equable part of the scarp-foot plain, between Beamsville and Queenston. The western parts of the plain and the upper bench were a little lower in value, though distinct from the dip-slope plain. The kamey areas of Ancaster and Fonthill and the beach ridges of the Fort Erie-Ridgeway area were the best lands above the escarpment. The poorest, occupying the interior clay flats, corresponded with the general farming zone.



icant. Obviously, human regions were beginning to accord with geographical controls. In the scarp-foot plain values were higher because farmers were paying for accessibility to the Hamilton and Toronto markets, for the fertile soils of the Iroquois plain and, above all, for freedom from frosts and from winter killing. Indeed, they were willing to pay more for climatic protection than for accessibility to the market, as we see from the fact that in the eastern districts farmers paid an average of \$80 per acre, while in the west they only paid \$60. Now the west had undoubtedly the best communications with Hamilton and Toronto. But it did not offer as high a margin of safety against early and late frosts or against killing winter temperatures.

Behind the Mountain, the 1881 land values were much lower, and were lowest of all in the ill-drained clay plains of the Welland and Lower Grand. This is the least accessible part of the Peninsula, and has the least productive soils. It is also the most extreme in climate. Hot, rainy summers are followed by cold, snowy winters. Agriculture suffers from the greatest number of thunder-storms, hail-storms, wind-storms and snow-storms of the Peninsula. The winter extremes (-34°F.) are three times as great as those of the St. Catharines region below the scarp. Winter killing has always been very prominent in the frost hollows of Wain-

fleet and Willoughby. Then, too, late spring frosts, followed by early summer rains, often delayed the sowing until the harvest prospects were ruined. Is it surprising, therefore, that the average land values were below the minimum for the poorest lands of the scarp-foot plain, and were three times less than the average value for Niagara township?

Thus we see that human values coincided more closely than ever with geographical differences. But it was left to the twentieth century to appreciate those differences to the full. For in this century the Peninsula has become more highly industrialized and more densely populated; competition has grown fiercer; and the processes of specialization and differentiation have rapidly increased. As a result the Peninsula has become sharply divided into a Fruit Belt, a Dairy Belt and a General-Farming Belt.

Specialization in these belts has become much greater. For example, although the 1881 Report indicated that the eastern scarp-foot plain had the highest concentration of fruit, nevertheless, only 11 per cent of the land was under fruit. Cereals and livestock were still the mainstay of the farmer. To-day, 91 per cent of the farms in this area are fruit farms.

Such a tremendous concentration on one type of farming is due to the new appreciation of the Fruit Belt in comparison with other fruit-growing districts throughout

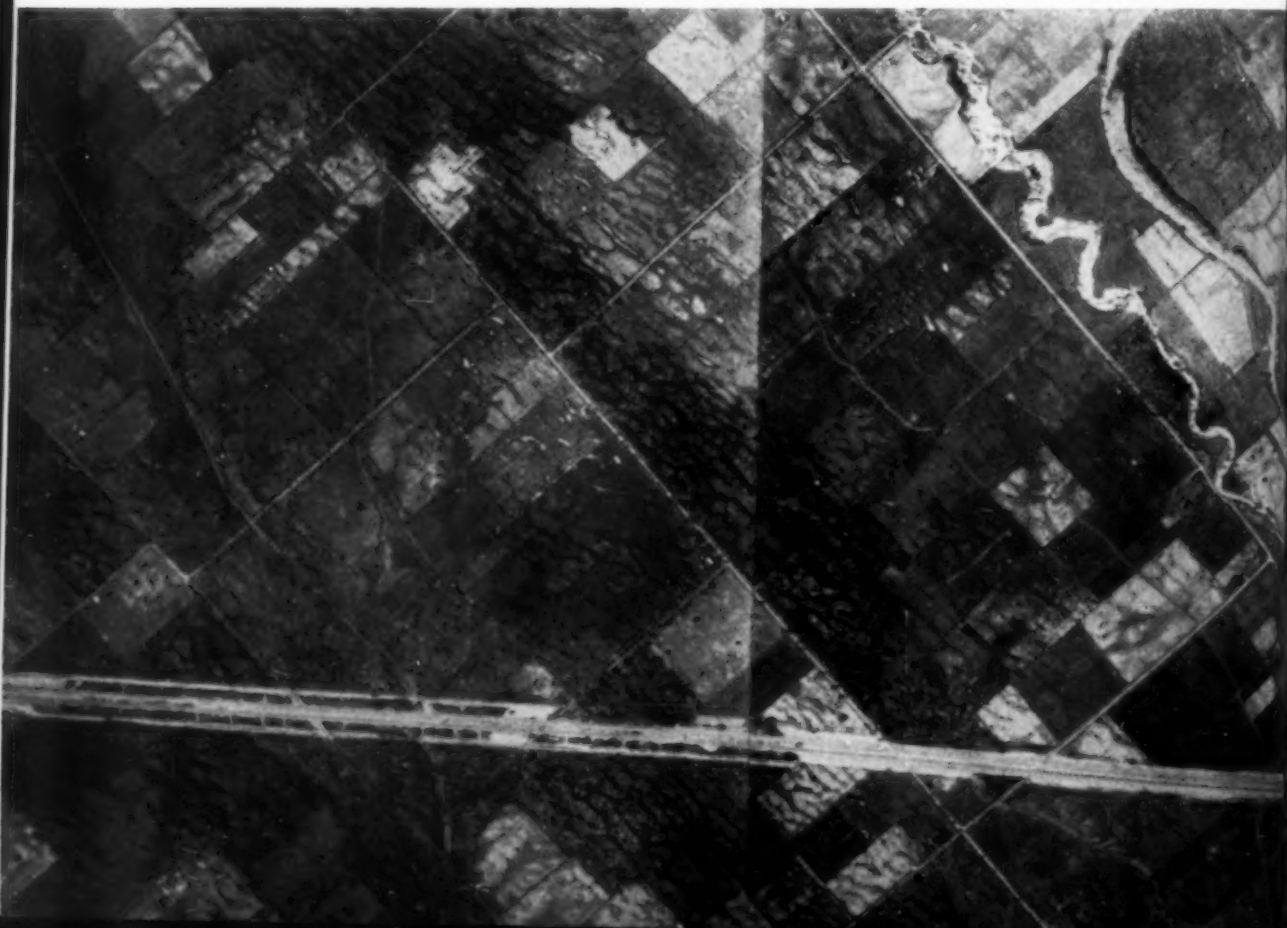
Canada. Increasing competition has multiplied its advantages. For the Niagara fruit district has a much greater freedom from winter killing than any other part of Ontario or Eastern Canada. Thus, with an extreme minimum of only -16°F. (in some parts, of only -10°), it has a better chance to escape the killing of trees than Leamington, with -20° ; or Kent and Essex, with -27° ; or Elgin, Norfolk and Halton, -34° ; or Georgian Bay, -35° . Its growing season is twenty-one days longer than that of Prince Edward County, and twenty-four days longer than that of the Annapolis valley.

This explains its high degree of success as a fruit region. It also explains the remarkable change-over in the fruit industry itself. For instance, Mr. Beadle, writing in 1881, said of the Niagara district, "Apples are the fruit by far the most cultivated". But ten

years later the pear and the plum had begun to displace the apple, which could be grown just as well in the Erie counties. But these regions could not support the more sensitive fruits. So the Niagara farmers started to concentrate on the fruits which were too delicate to be grown with assured success elsewhere. Cherries, peaches and apricots came into favour, while the apple became relatively insignificant. Thus the use of the land completely changed as the farmers realized the truly unique features of their environment in contrast to those of other regions, and as they capitalized the contrasts.

To-day, there is a particular adaptation being made in each part of the Fruit Belt, showing a clearer grasp of the differences which topography, soil and climate make. For instance, the bench and trench topography has manifested itself in land use as

The interior clay plains of the Niagara Peninsula offer some of the most difficult farming land in Canada, with extensive areas of swamp, and with wide, flat, monotonous fields of compact, ill-drained clays that were once the bottom of glacial lakes, such as Warren and Lundy. Here the Queen Elizabeth Highway is cutting through densely wooded and very swampy land as it crosses the Welland and Lyon creeks on its way to Fort Erie. The only good farms are near the rivers which have cut down well below the level of the plain and therefore quickened the drainage of the nearby fields. But away from the effects of the rejuvenated rivers, the fields are difficult to till, and remain under pasture or woods. It is a zone of poor general farming.



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Expansion of St. Catharines on to the clay trench. One of the earlier Welland canals and the Queen Elizabeth Highway are shown approaching St. Catharines from the southeast, across the Iroquois plain. This plain has a remarkable clay trench that runs through its centre, dividing off the sandy-loam soils of the Iroquois beach to the south from similar soils near Lake Ontario to the north. The clay trench has never been very fertile, and long remained an enclave of general farming within the Fruit Belt. Contrast the farming seen in the foreground with the many orchards noted northwest of the line marked F. It has been easy for factories (left foreground), roads, railways and houses to spread on to the poorer farmlands of the clay trench, though they stop short at the sandy-loam soils of the fruit-growing areas.



well as in land form. The high-level terrace south of St. Catharines can be taken as typical of the response along the entire clay bench. Immediately on its edge, on the Number 8 Highway, there is a string of large dairies with orchards of plums, pears and apples, and extensive vineyards. The grapes are usually planted on the lower slopes of the Iroquois beach; the orchards straddle the highway following the beach; the fields of grain, hay and pasture climb up the terrace toward the Mountain. Higher up on the bench is another line of farms, of smaller size. They have a grapery here and there, but no orchards, except a few trees for domestic use. For the soil is too heavy; it has too many wet spots, and often drowns out the fruit trees; it is also subject to winter cold and spring heaving. Indeed, were it not for the popularity of fruit throughout the rest of the scarp-foot plain, very little of it would be raised on the clay bench. At the beginning of the century, the bench was still a zone of grain farms, raising fodder for the many horses used in the city, and producing barley for the breweries.

To-day, it is given over to dairying and represents an outlier below the Mountain of the great Dairy Belt which lies above the scarp, just as the outwash sands and beach ridges above the Mountain are outlying representatives of the scarp-foot Fruit Belt.

Down from the bench one meets with the trench topography of the old Iroquois plain. This plain is the beach platform of glacial Lake Iroquois, and developed its profile under the action of fairly rapid waves of short length which evolved a marked trench in the upper beach zone. Coarse material accumulated in the trench and the sand removed in its formation went to build the outer margins of the beach. Thus, three zones are found on the Iroquois plain: first, an upper beach, just below the Iroquois shoreline, floored with fine gravelly sand, closely underlain by clay, with here and there the remains of a boulder platform; secondly, the central clay trench, with quite imperfect drainage; and finally, an outer sandy zone along the present Ontario coast, with relatively deep sandy-loam topsoil over the clay subsoil, and well drained.

The first zone is characterized by mixed fruit and dairy farming. The fruits are mostly pears, plums and grapes. Then, as one reaches the central trench (which is followed by the Middle Road), fruit decreases and may disappear altogether. Large stock farms often take the place of fruit farms as, for instance, in Niagara township, where a great deal of land is under pasture and bush. Such fruit as there is usually consists of grapes. Finally, as one climbs from the clay depression over the sandy loams of the

coast, a dense settlement of orchards and gardens is encountered. Fruits of every variety, but especially peaches, are seen.

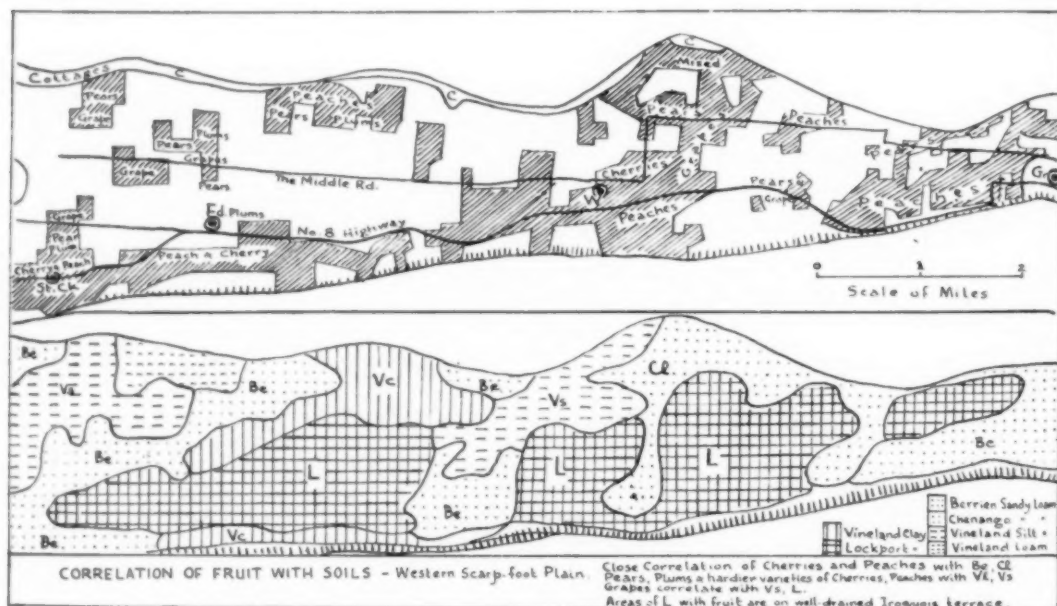
However, one must not imagine that each topographic level has a uniform use of land throughout its length. Differences occur along any one level as the result of various soil and drainage conditions. Soils are important in dividing the different kinds of fruit orchards from each other. Take the Stoney Creek district on the Iroquois plain, for example. (See Fig. 6.) The great glacial bar, with its Fox gravelly-loam soil, is the chief site for cherry orchards. Then Berrien sands succeed to the north. Those with better drainage and with deeper layers of sand resting on the clay subsoil are associated with excellent peach orchards. Poorly drained Berrien, with shallow sandy knolls and a high clay level, is more often planted to plums. Next are the Vineland silty loams, with still poorer drainage, which are reserved for pears and apples, while the heavier Lockport clays, if planted to fruit at all, are kept for grapes. Similar conditions may be ex-

perienced anywhere in the Fruit Belt. In general, as fruit farming evolved, apple orchards replaced grain on the better soils; then apples were themselves displaced by cherries and peaches. Changing awareness of the soil factor has led to changes in the use of land.

Changes also occur with a growing realization of climatic control. The main factor dividing one fruit district from another is now winter cold. Cold waves may swing down from the Patricia district and follow the Mountain brow, or else they may spread over the western plains and move into the lower lakes from the southwest. In either case, the dip-slope is much colder than the scarp-foot; and, as a rule, the landward end of the scarp-foot plain, close to the uplands of southwestern Ontario, is colder than the eastern part.

In 1943 I studied the effects of one of these cold waves, which struck in February. It came down the eastern edge of the Ontario uplands, spread widely across Halton and Norfolk and invaded the Peninsula. Tem-

Fig. 6—Fruits and soils. The Stoney-Creek, Winona and Grimsby plain. The Number 8 Highway runs along the edge of the Iroquois beach and follows the margin of the Lockport clays. The Middle Road occupies the clay trench right through the middle of the Lockport soils. The Iroquois beach forms a gravelly bar south of Stoney Creek, famous for its cherries, while sandy outwash and shore fans have spread over the old Iroquois beach platform, and given rise to the peach and cherry orchards of Winona and the peach orchards of Grimsby. Where the sand thins out, and clay comes close to the surface, pears and plums are more common. Much of the clay is without fruit, but grapevines are increasingly successful.



peratures fell rapidly until -20°F. was recorded at Vinemount, and -22° at Fonthill, both above the Mountain. Below, temperatures were distinctly milder. From Burlington in the west to Grimsby, about half-way, the minimum stood at -16° , or just below the critical temperature for the winter killing of the peach tree. But east of Grimsby the weather became progressively milder. Beamsville recorded -14° ; Vineland, -12° ; St. Catharines, -11° ; and Virgil, -10° .

Many peach buds and not a few peach trees were killed as a result of the cold snap. The Vineland Horticultural Station made a count of peach buds killed in the Fruit Belt. Out of a total of about 675,000 trees, at least 200,000 were completely damaged, and another 100,000 were partially damaged. But the injury varied considerably with the different parts of the belt. Above the scarp it was 100 per cent, or a complete kill of the fruit buds. This represented about 70,000 trees. From Burlington, at the extreme western end of the belt, to Winona there was an almost complete kill, although the Golden Jubilee peaches suffered the least, with 85 per cent killed. The Elbertas suffered a total casualty. (See Fig. 7.)

Beyond Grimsby, there was a notable decline in peach mortality, Beamsville having lost but 70 per cent of its crop, while from Vineland to St. Catharines the loss was about 33 per cent. At the extreme northeastern part of the belt, around Niagara-on-the-Lake, no crop lost more than 20 per cent of its buds. Such a distribution shows a general lessening of risk from above the Mountain brow down to the Ontario shore, and also from the west to east across the Fruit Belt. It helps to explain why, although Niagara township has 538 fruit farms out of a total of 549 farms, or a 97.9 per cent concentration on fruit, East Flamboro, at the Burlington end of the zone, has only 233 fruit farms out of a total of 472 farms, representing 49 per cent. This also explains why the hardier fruits predominate in the western districts; why, for example, Elbertas, one of the hardiest peaches, are much more common at Winona than at St. Catharines.

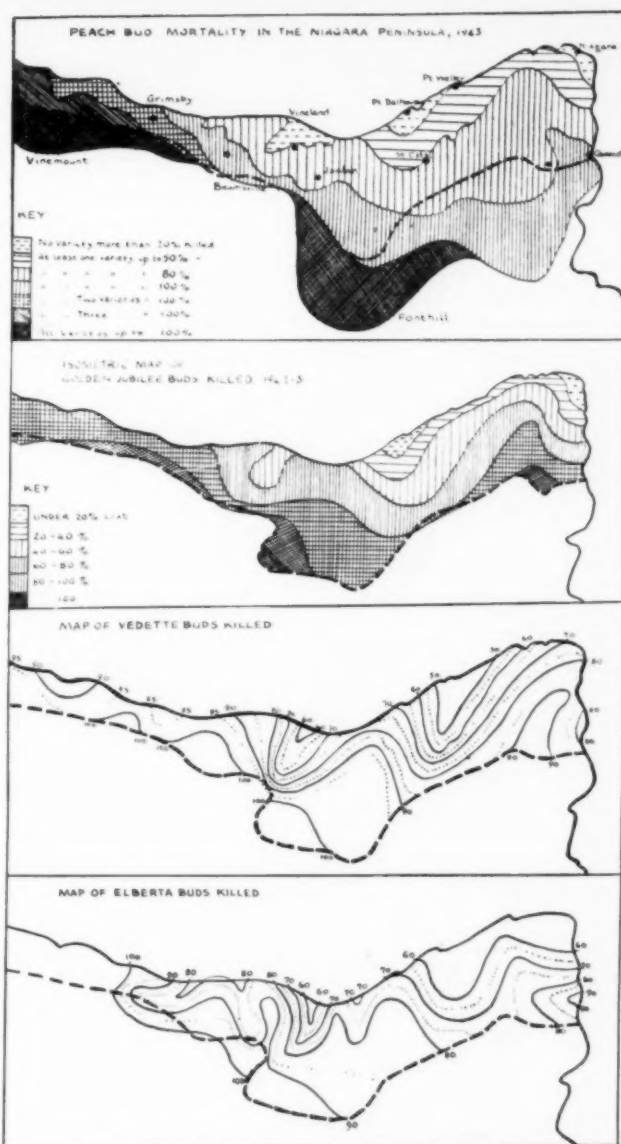


Fig. 7—Peach-bud mortality in the Niagara Peninsula, 1943. These calculations were based on Vineland reports and my own counts; they are, perhaps, a little higher than eventually proved to be the case, but the general distributions are still the same. They show the tremendous influence of the Niagara escarpment, and the distinct tendency for conditions to improve in the northeast, away from the Mountain, and away from the westerly source of cold air. The heavy broken line indicates the escarpment.

Thus, we see that modern uses of land have changed completely the more generalized patterns of the last generation, and have introduced much more specialization, and produced a greater differentiation. The farming of the scarp-foot plain shows up as clearly different from that of the dip-slope; moreover, it has revealed the differences between bench and trench topography, between sandy loams, silt loams and clays,

between a more equable weather in the east, and a more extreme one in the west. In other words, human divisions arise from geographical ones, and, contrary to general opinion, the more men progress, the more dependent they become upon their environment.

This is true even of a relatively uniform geographical region like the dip-slope plain. The casual observer would notice very few differences in topography, soil or weather as he crossed the plain; yet they do exist, and they do have their effect. Let me cite but one small area, that between Mt. Hope and Caistor. In 1881 there were no distinctions in the farm types of this district. By 1911,

distinctions started to appear between dairies and general farms. To-day we find dairies, grain farms, mixed-stock farms and beef-stock farms.

Time, then, has revealed a growing differentiation. But changes in time have found their levels in space, following upon growing spatial differentiation. The different farm types do not lie together haphazardly, but follow definite patterns. These are the patterns of the underlying topography, soil, drainage and weather conditions.

In Glanford township, the topography is dominated by the high Mt. Hope moraine of coarse clay mixed with boulders, and with a rolling uneven surface. In Binbrook and Grimsby South the moraines have been bevelled off by lake action, and die away. Farther south on the dip-slope the last perceptible undulations of the ice deposits pass into flat lacustrine clays of Gainsboro and Caistor townships. These clays are finer grained and more compact, and remain ill-drained.

Climate underlines the contrasts in soil and drainage. During the winter, masses of cold air flow into the region. The coldest air sinks down into the hollows between the moraines and spreads over the clay flats. Temperatures may fall as low as -34° . But on the high moraines above, temperatures do not fall below -20° , and we have a typical inversion whereby the lowland is much colder than the nearby ridgeland. Consequently, winter killing of alfalfa, etc., is much more severe in the frost hollows.

In these hollows, spring is retarded. I noticed that when farmers were putting in their grain on the ridge, their neighbours found it still too wet and cold to do so. Farmers tell me that there is usually a week's



The Mt. Hope moraine. Shown here is a segment of the low morainic country on the upper part of the Niagara dip-slope plain, near the Mountain brow. A lateral road that feeds into Highway 6 at Mt. Hope is shown. It follows the edge of the moraine and is the site of some fine dairy farms. Most of these farms run back to a well-marked divide that can be made out at the parting of the creeks. The lines A-A and A'-A' roughly enclose the rolling morainic land that slopes down unevenly from the water-parting. Here the fields are well-drained, and well-cultivated; many of the creeks, even, are ploughed across. But to the north or south of these lines, the creeks debouch on to the surrounding clay flats; their bottoms are wide and marshy; they are flooded in spring; and, far from being ploughed, are left as rough pasture. The interfluvies between the streams are low and often just as marshy. Notice the prevalence of woodland, particularly to the south, where there is not as much cleared land, and the land that is cleared is not so well cropped.



Left column, reading downwards—Nos. I to IV
Right column, reading downwards—Nos. V and VI

Contrasts in topography and land use. Near the Mt. Hope Cemetery there is a good division between the moraines and the clay flats of the Niagara dip-slope plain. Looking north one sees (i) the Mt. Hope moraine rising gently above the surrounding flats, which are shown with their flat horizon but ravined surfaces (ii) as one looks to the south towards the Welland vale. Closer examination of the moraine reveals many well-cultivated, slightly rolling fields (iii) which are contrasted with those (iv) across the road, in which the flat, compact clays are broken only by shallow ravines or by wet spots and ponds. The well-tilled fields of the moraine slope back to a series of large dairy farms with big barns and tall siloes, and with prominent red brick houses (v). Not far away is this general farm, where, across the naturally ill-drained fields of the clay flats, rises (vi) a severe frame house, which has not been painted for years, and suffers from lack of structural repairs. These contrasts in settlement are quite typical.

difference, and often it remains so wet on the clay depressions that the grain cannot be planted, and extra fodder has to be bought.

It is surely no wonder, therefore, that clear distinctions are observable in the farming, which can be shown statistically thus:

Township	Acres per cow	Acres per beef cattle	Percent- age of pasture	Percent- age cropped	Percent- age of improved pasture	Percent- age of natural pasture
Glanford—high mor . . .	3.1	4.6	15.9	73.0	11.8	4.1
Grimsby S.—bev. mor. . .	4.3	5.6	16.6	65.8	12.2	4.4
Binbrook—faint mor . . .	4.7	5.4	18.1	62.2	13.9	4.2
Caistor—clay flat	6.6	6.3	18.6	60.0	15.4	2.7

These figures show a remarkable gradation from the high morainic areas through the bevelled moraine and the very faint morainic country to the flat ill-drained clays, which were once lake-bottom deposits of glacial waters. In the high moraine dairy farming predominates, the much higher density of milk cows being related to the dairyman's extensive use of fodder derived from the well-drained ridgeland soils. The clay flats are characterized by a higher density of beef cattle, and farmers here go in for hog raising. Dairies are few and far between; and the lower densities of milk cattle are correlated with a lower cropped area and a greater necessary dependence on pasture.

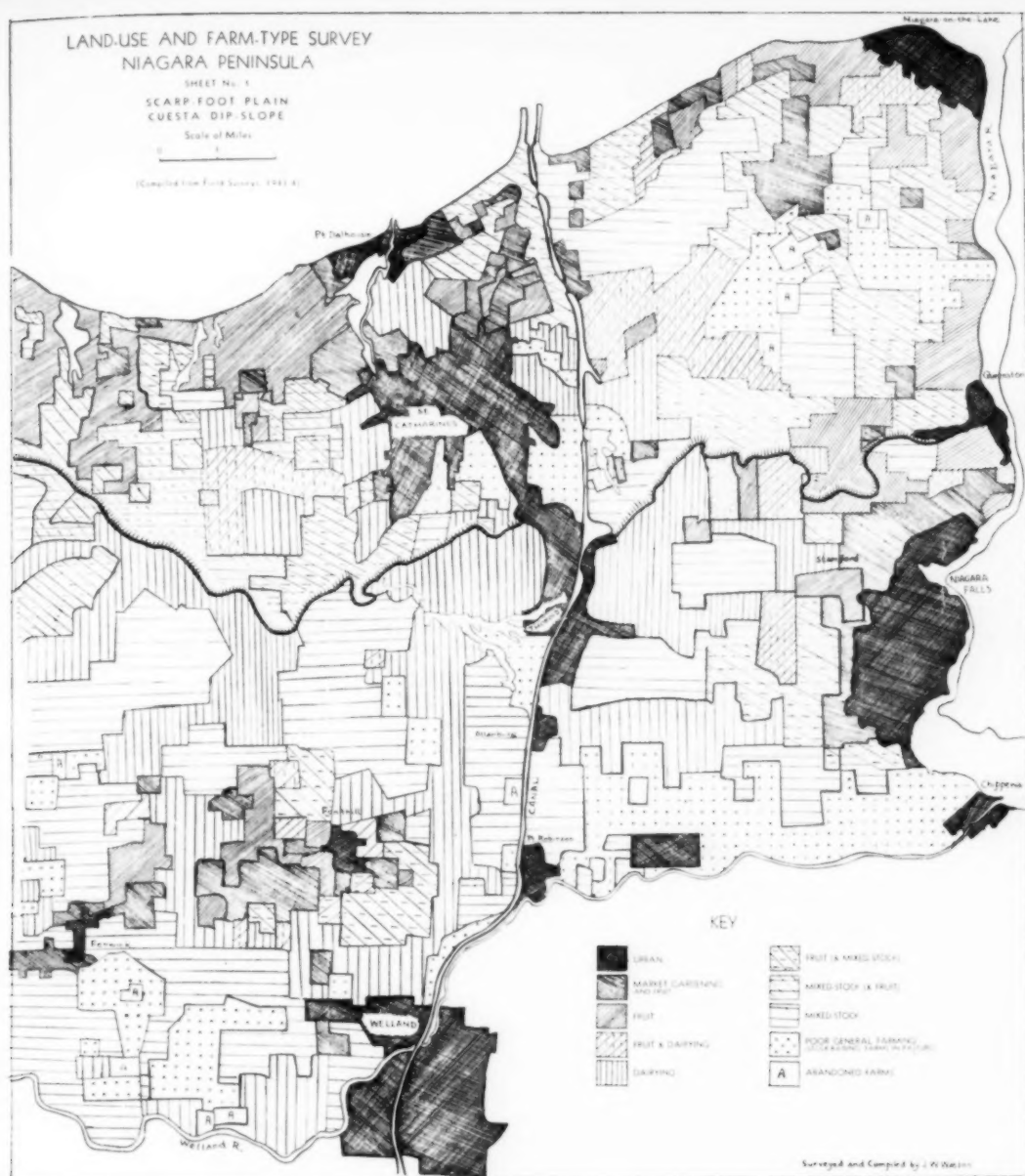
Thus we see that on the dip-slope plain, as at the foot of the scarp, modern technical progress has sharpened man's awareness of his environment and accentuated his dependence upon it. For that is obviously the lesson we learn from mapping the last hundred years of farming in the Niagara Peninsula. At first, men had plenty of room, there was not much competition, their needs were few, and their methods of farming were simple; consequently, they responded to but the broadest divisions of the Peninsula—to the coastal plains, the limestone escarpments, the shale depressions.

Then, gradually, Ontario began to fill up. Competition was felt from southwestern Ontario and from central Ontario, and also from the American mid-west. Farmers had to revise their methods, improve their stock, drain their lands, and rotate their crops more scientifically. Perhaps they even had to face up to an entire change-over in the type of

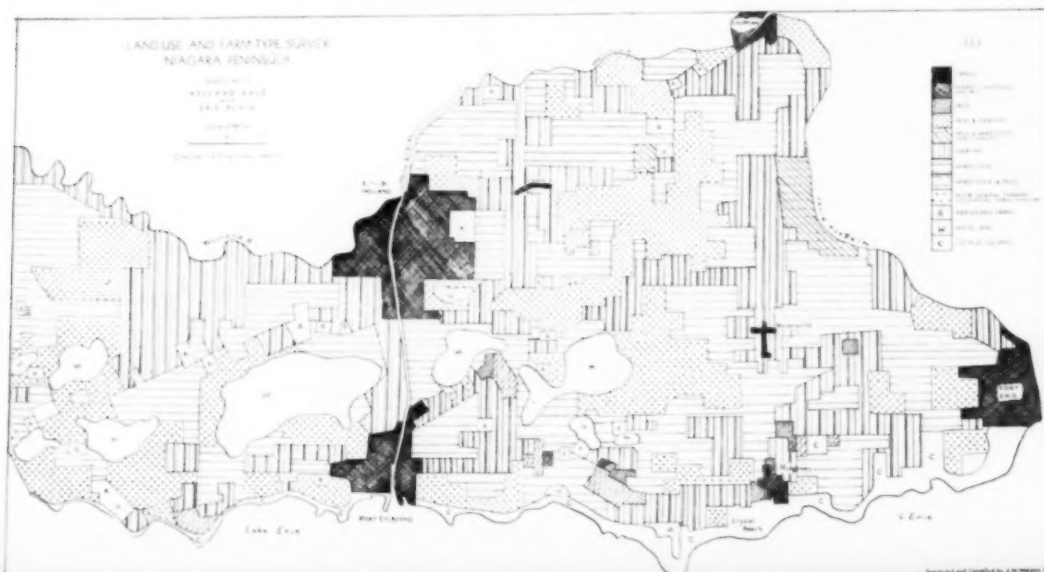
agriculture practised. As they did so, pressure on the land became more acute, and it had to be used more efficiently. Therefore, farming made a more exact adaptation to the local environment, and differences in soil type began to control the differences in farm type. At the same time, each of such minor features of the topography as drumlins, moraines, beach ridges and lacustrine flats began to exert a unique influence and to demand a still more precise adaptation of farm type to land form.

Finally, in our own era, competition has increased even further. Farmers have to face competition from the Prairies and British Columbia as well as from Eastern Canada. They also have to face an unpredictable overseas situation. All this necessitates technical progress and better economic organization. Yes, but it also requires a closer study of the land, a still more scientific use of topography and soil, and, above all, a greater consideration of the climate. For unless farming can adjust itself to the very slightest differences in weather, it cannot make the most of those advantages it seeks in soil and in relief.

It is, therefore, by becoming progressively better adapted to the environment, by making an ever finer and truer adjustment to geography, that the farmer can best succeed and agriculture go on developing. That is one supreme reason why geography should be studied to a far greater extent in our schools and colleges—because it is the science of adjustment; the science which studies the correlation between human values and environmental opportunities and limitations.



Figs. 8 and 9—Sheets 1 and 2 of the land-utilization map of the Niagara Peninsula, Lincoln and Welland Counties



A. Y. JACKSON—The Development of Nationalism in Canadian Painting

by DONALD W. BUCHANAN

A FIRM nationalism in painting, making full use of such symbols of northern geography as towering pines, rock-girt lakes, and sharply etched clouds, was typical of the work of the Group of Seven. The leaders of these painters, who came into prominence in Canada during the early nineteen-twenties, were A. Y. Jackson, Lawren Harris and Arthur Lismer. Placing emphasis on strongly patterned compositions of wilderness landscape, they were influenced partly by the impact of the scenery they set out to describe, and partly by their knowledge of and interest in those contemporary experiments in painting which were taking place both in England and in France.

With A. Y. Jackson, in particular, there was a combination of learning from abroad and of new inspiration from Canadian scenes. Jackson had been born in Montreal and educated there, but in 1910, he went to continue his art studies in Paris. There he was taught much about the use of pure colour in painting and about the scientific approach of the Impressionist masters to the analysis of light and shade. On his return to Canada, he first applied this technique in a series of canvases of farm and woodland scenes of the Eastern Townships. He soon found, however, that the clear atmosphere of his native Canada called for a different, a more sharply defined, treatment than that which he had learned to employ when painting the softer and more mellow landscapes of France.

His most characteristic style dates from the days when he first tried to paint the rough and rugged scenery of Northern Ontario. Confronted there with the task of depicting a chaos of untidy bushland, of rocks, turbulent waters and second-growth stands of small timber, he quickly discovered the need for elimination—and started to pick out the more significant forms and to emphasize their predominant shapes and tones.

Describing his sketching in Algoma, Jackson said: "One must know the north country intimately to appreciate the great variety of its forms . . . From sunlight in the hardwoods with bleached violet-white tree trunks against a blaze of red and orange, we wander into the dense spruce and pine woods where the sunlight filters through, gold and silver splashes playing with startling vividness on a birch trunk or patch of green moss. Such a subject would change entirely in ten minutes, and unless the first impression was firmly adhered to, the sketch would end in confusion." He and his colleagues, he added, had accordingly, "frankly abandoned our attempts at literal painting, and treated

our subjects with the freedom of a decorative designer".

"Our atmosphere", he said, "was clear and sharp, our colours bright—crude, if you will—and on top of this were four changes of scenery such as they never knew in Europe. In summer it was green, raw greens all in a tangle; in autumn it flamed with red and gold; in winter it was wrapped in a blanket of dazzling snow, and in the springtime it roared with running water and surged with life." In such phrases, which have been much quoted since, he brought home to Canadians the meaning of his nationalist approach to landscape painting.

Afterwards, for many years, his favourite subjects were the rolling farmlands of Quebec, which he specially loved to paint in the spring when the melting snow lay heaped in ridges on the fields. In recent paintings, done among the lakes of the Algoma District of Ontario, his brush has acquired a new lightness—even a gaiety—of touch.

Jackson was the first Canadian artist to be honoured by a motion picture describing his work. This film, prepared jointly by the National Film Board of Canada and the National Gallery of Canada, was done in colour photography and has now been shown widely both in Canada and abroad. Entitled "Canadian Landscape", it demonstrates how Jackson first makes small sketches on wooden panels out-of-doors, and later works them up in his studio into larger compositions on canvas. The film also provides the spectator with a close and accurate description of the scenery of rural Quebec in winter and spring, and of Northern Ontario in autumn and summer.

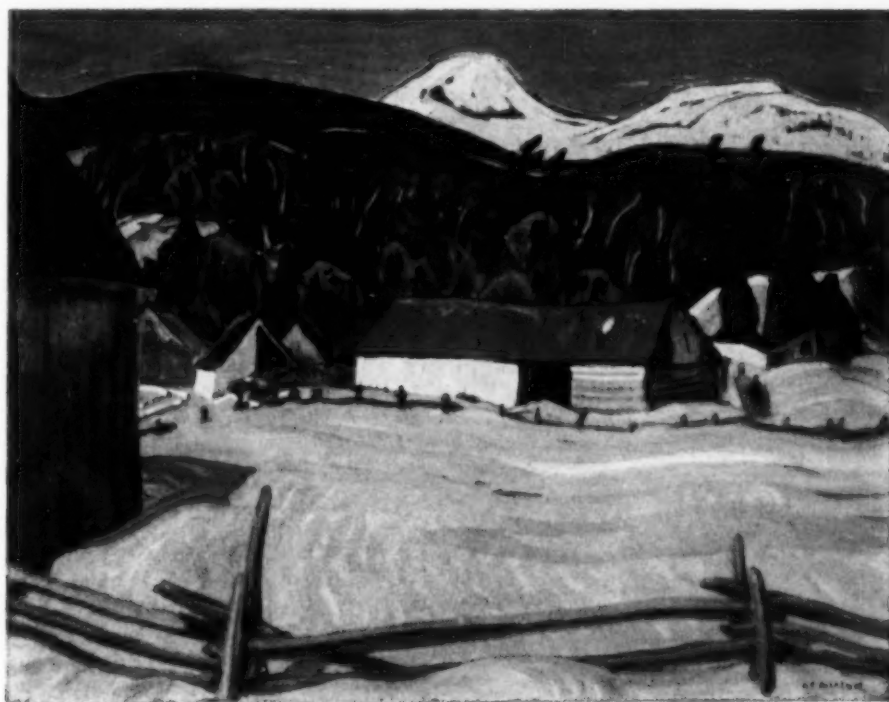
Jackson continues to paint in Quebec regularly every spring. But in recent years the western plains have also attracted him. Teaching now in the summer at the Banff School of Fine Arts, he frequently goes on sketching tours into the foothills near Calgary or farther south into Crow's Nest Pass.

His compositions are much in demand, and this assurance of economic security has enabled him to become a traveller, a seeker of new scenes, more especially of those on the pioneer or wilderness fringe of Canada. This includes the fur-trading posts of Baffin Land, the mines of the Northwest Territories, the air-fields of the Yukon, and the valleys of the Rockies, as well as all his old haunts along the lower St. Lawrence.

Jackson has toiled through the years of experiment into the years of fulfilment, and to-day is recognized as our most distinguished landscape artist.



"Algoma Lake", by A. Y. Jackson, R.C.A.



"April, Petite Rivière", by A. Y. Jackson, R.C.A.

AMONGST THE NEW BOOKS

The Anatomy of Peace

by EMERY REVES

(The Mussen Book Co., Toronto, \$2.50)

"GIVE PEACE IN OUR TIME"; thus the ancient liturgical invocation epitomizes the hope of men in all ages that their generation will be one of the fortunate ones knowing no war. After two catastrophic wars, the necessity for a peaceful solution of the world's problems now appears more urgent than ever before. Mr. Reves, in this brief book, presents a brilliant and thought-provoking analysis of the causes of war and outlines the only conditions under which world peace can be established. Admitting Mr. Reves' premises, the reader will scarcely avoid following his path of logic and argument to the conclusion that peace is only possible where nations are subject to international law and some form of super-government. Briefly, he develops his argument as follows.

For more than fourteen centuries, the Ptolemaic theory that the earth was the centre of the universe, and around it the sun, the planets and the stars revolved in their order, governed man's thought, and it was only at the end of mediaeval times that Copernicus, diffidently, and with a caution that showed the original thinker, advanced his theory that the earth was only one of a number of planets revolving around the sun. The nations of the world still adhere to Ptolemaic thought, each the centre of its own small universe, and each viewing events solely from the central position of national interest. The history of the inter-war period, as seen from the nation-centric viewpoints of the United States, of Great Britain, of France or Germany or Russia, shows how startling is the divergence in the interpretation of the same events by different nations, and how this insistence on the nationalistic viewpoint inevitably led to the second World War. Under this conception of world affairs, political, economic and social problems are controlled by law within the limits of each nation; but the same relationships between men of different nations are on an entirely different basis, and can only be solved by treaties and pacts negotiated through the cumbersome protocol of diplomatic procedure, and with no means of enforcement except economic pressure of war.

This approach to world problems was valid in days of slow transportation, of self-sufficient communities and limited trade; but the revolutionary changes of an industrialized age, which gets its raw materials from, and finds its ultimate markets in, the world as a whole, are so great that this theory is no longer adequate. Our political and social conceptions are Ptolemaic, while the actual world in which we must live is Copernican.

Neither capitalism, socialism, fascism nor religion can provide the cure of the world's ills. Capitalism, with its shibboleth of free enterprise, arose almost simultaneously with the democratic states of the late eighteenth

century. Unlike democratic institutions, which provided for freedom between men within laws that protected the individual from trespasses and torts by his neighbours, capitalism was uncontrolled and unregulated. Business competed with business, labour with labour, while free access to raw materials and free trade provided a world-wide market place. This worked well while industrialism was confined to a few nations, but soon each state took measures, in self-defence, for the protection of its own industries, and free enterprise was no longer free, but confined by tariffs and export licenses designed to make each nation self-sufficient. Business combined in larger and larger units, attempting to cut across national lines by cartels and trade arrangements; labour made its own combinations for the protection of its interests, and soon it became difficult, if not impossible, for a new competitive business to establish itself against these great monopolies, or for the individual labourer to obtain employment outside of a union. Capitalism, dependent on the world for raw materials and markets, was channelled into national compartments and has more and more become an adjunct to the state, regulated in the national interest. Under such controls, capitalistic society tends towards fascism, and through its competitions and frictions with other nationalistic economies plants the seeds of further wars.

Theoretically, socialism is international in character, but in practice its exponents direct their energies toward national ownership of the tools of labour. The socialized state is faced with the same restrictions on trade, the same monopolies of raw materials and the same barriers to markets as is the capitalistic nation, and it reacts to the call of national interests and sovereignty in exactly the same way. It has been demonstrated that industry can thrive and expand under both capitalistic and socialistic systems, which, in fact, can exist side by side within a single nation, but the unregulated interests of the socialized state are quite as great a menace to the world's peace as those of a nation under any other form of government.

During the inter-war period, some twenty-five allegedly democratic states evolved into fascist dictatorships. In fascism, man has created a Frankenstein-like monster in the form of a state which absorbs all the energies, aspirations and freedoms of its subjects. Such a state recognizes no law other than its own interest, either for its own people or other nations, and, as we have seen in recent years, will accept no limitations of national interest.

It can therefore be argued that *all* forms of government and *all* economic systems, when channelled into sovereign nations, each a law unto itself and amenable to no general and enforceable rules of conduct, are dangerous to peace.

The great religions of the West—Protestantism, Catholicism, and Mohammedanism—have at times almost achieved the power to regulate world affairs along peaceful lines, but have always stopped short of

success. They have now become tools of nationalism. Protestants, Catholics and Mohammedans in one country will kill in battle their co-religionists of another country without scruple, and after nearly two thousand years of Christianity, the world has seen a revival of savagery and bestial cruelty that has had no parallel since the days of Tamerlane. Religion, even a universal religion, if such were possible, when divided on national lines will neither bring nor enforce peace.

When men first began to associate in tribes or groups, it became necessary to formulate rules—laws to ensure each individual protection from injury by others of the group. As groups became larger and made contact with other tribes, disputes arose which culminated in tribal wars. When these became sufficiently serious to endanger the race, we see several tribes combining under an over-all authority capable of enforcing law over these warring units. History is full of wars between tribes, between city states, between barons or princelings, which lasted until these lesser units were placed under the regime of law by a superior authority capable of enforcing that law. Wars, then, arise from the conflict of sovereign and independent units and cease when such units are combined under law-enforcing authority.

While every citizen of a sovereign state is subject to the laws of that state, there is no law or authority to regulate the conduct of the state itself in its relationship with other states. Treaties and compacts take the place of law, and these are enforceable only by war. It follows that war will exist so long as these states retain absolute sovereignty not restricted by law.

The earth's surface is now broken up into some sixty or seventy of these sovereign states, each jealous of any infringement on that sovereignty, which, at the same time, does not, under present conditions, fulfil the most elementary function of a sovereignty—the protection of its people. Twice within a generation the world has been plunged into war, and even the most powerful of the nations has been unable to protect its young men from the battlefield and its women and children from the bombing terror that flies by night. If the sovereignty of Britain, France or the United States cannot protect their people from these horrors, what then of the smaller nations of the world? Their existence is contingent on the tolerance of their larger neighbours and their sovereignty, therefore, is merely a pose.

Sovereignty expresses itself in different ways. There is the sovereignty of the nation which now acknowledges no superior authority, but is, however, content to depute a part of its authority to the state or province, which in turn further allocates certain powers to the county, township, city or town, which are each sovereign within certain limits, but which also have an expression in the larger sovereignty of the nation of which they are a part. These institutions have developed to meet the need for the orderly relationship of man to man within the framework of law. This does not limit man's right to self-government but extends it

from the township to the province and on to the nation itself. Similarly, a super-government, making and enforcing laws over nations, would not be a diminution but an extension of national authority.

Wilson, with his doctrine of self-determination for each racial group, was a proponent of a system that the industrial revolution and rapid means of transport has made obsolete. The old League of Nations, with its insistence on the absolute sovereignty of each of its member nations, was ineffective by reason of that very sovereignty. Mr. Reves believes that the present Organization of the United Nations will fail for the same reason. Neither the League nor the United Nations has established or can enforce a code of laws for international affairs, and without the rule of international law there can be no peace.

No charter or code of international law is suggested in this book. The combined wisdom of the world should be competent to draw up a code that would protect nations, great and small, from aggression and arm it with the sanctions that would make its rule effective. Diverse nationality, race or creed are not bars to people living in harmony. Catholics and Protestants slaughtered one another for centuries over religious differences, but now live together side by side and devote their energies to common aims of social betterment. Germans and Frenchmen have been at one another's throats for hundreds of years, but, in Switzerland, Germans and Frenchmen live side by side in peace and quiet. All the races of Europe go to make up the population of the United States but they have coalesced into a homogeneous unit—American and not English or Scotch or German or Polish or any other of the score of races that have been transmuted in the melting pot of the new world.

Peace is dependent on the extension of a common law over all men and all nations, giving to each the opportunity to enjoy his share of the world's fruits and demanding of each subordination of the hollow sham of complete sovereignty to a common good. The reign of law is the reign of peace.

P.E.P.

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EDITOR'S NOTE-BOOK

M. J. and J. L. Robinson—See biographical sketches in C.G.J. for January, 1946.

J. W. Watson, M.A., is at present Associate Professor of Geography in charge of developing the first Department of Geography at McMaster University. He previously studied at Edinburgh University, where he obtained his M.A. in geography, later becoming a medallist of The Royal Scottish Geographical Society and securing a research scholarship under the Carnegie Trust to study land use and settlement problems in the Highlands of Scotland, following which he lectured in geography at Sheffield University. Travelling in Europe for several summers whetted his interest in political geography, particularly that of Eastern Europe, and since coming to McMaster he has written and had published a number of articles on geopolitical problems. Professor Watson is a fellow of The Royal Geographical Society and of The Canadian Geographical Society. (See also C. G. J. for September, 1944, and May, 1945.)

Donald W. Buchanan is one of the editors of *Canadian Art* magazine, and editor of *Canadian Painters*, recently published by the Phaidon Press, England. (See biographical sketch in C.G.J. for May, 1946.)

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W. H. Corkill, European representative of the Society and a Fellow, is a publisher and writer living in Thanet who has, nevertheless, had acquaintance with Canada from coast to coast over many years. A veteran of the 1914-18 war, he was transferred from the Reserve of Officers to the R.A.F. in 1940, and sent to Canada, where he served as a staff officer attached to the R.C.A.F. at Regina, Calgary and Winnipeg until 1944. After being posted back to England, S/L Corkill was Senior Personnel Officer on a Radar Wing in "Doodlebug Alley."

AMONGST THE NEW BOOKS

(Continued)

Insects of the Pacific World

by C. H. Curran

and *Fishes and Shells of the Pacific World*

by J. T. Nichols and Paul Bartsch

(Macmillans, \$4.75 and \$3.25 respectively)

Two more in the series of studies of the natural history of the Pacific World issued under the auspices of the American Committee for Wild Life Preservation. Like their predecessors, they are careful studies by specialists in their particular fields, illustrated by line cuts and good end maps.

Australia: The New Customer

by Howard Daniel and Minnie Belle

(The Ronald Press, New York, \$4.50)

A detailed description of Australia's commerce and industry and the possibilities for American trade in the post-war era. The subject is introduced by well-written chapters on the land, its people and political institutions, and continues in a survey of import and export trade, agricultural produce and manufactures. Wartime expansions in industry and changes in the flow of commodities due to the exigencies of war are discussed at some length, evidently in the hope that the United States can largely replace British interests in the future. A valuable handbook on Australia and Australian trade.

(Continued on page XVIII)

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(Continued from page XV)

Outdoors with a Camera in Canada
by Dan McCowan
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Some fifty reproductions of photographs of wild life, flowers and scenery in the Canadian Rockies, each faced with a page of descriptive text. For many years Mr. McCowan has been a student and lover of Canadian wild life, and in the present book he brings to the reader something of his knowledge of the Canadian Rockies and of their furred and feathered inhabitants.

The Constant Star
by George Blake

(Collins, Toronto, \$3.00)

A novel written around the ship-building industry of the Clyde in the first half of the nineteenth century when the House of Oliphant dominated the town of Garvel. The Oliphants (a loose partnership of two aged brothers, both bachelors) are ship owners and ship builders, have plantations in the Indies and outfit privateers to prey on French commerce. At the time the story opens two grandnephews are brought into the business. Julius, the central figure of the story, whose interest is in ship building and ship design, is one; while Mark—greedy and aggressive, who on the death of the senior partners soon gains control of the old firm's major interests, (leaving only the shipyard to

(Continued on page XIX)



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(Continued from page XVIII)

his cousin—is the other. The divergent lives and characters of these two cousins and their sons form the body of the story which continues to the Crimean War and the war between the States. The industrialization of the Clyde district, the coming of the steamboat and railroad and the refinements in the design of wooden ships which marked the great and final age of sail, form a vivid background for characters that are well and skilfully drawn and a tale that will hold the reader's interest.

* * *

Science and Scientists in the Netherlands Indies, edited by Pieter Honig and Frans Verdoorn. (Board for the Netherlands Indies, Surinam and Curacao—New York, G. E. Stechert—\$4.00)

A compendium of scientific activities in the Netherlands Indies, including original articles, reprints and translations, as well as a number of travel accounts of distinguished visitors to those regions. 481 pages, illustrated, and with attractive end maps.

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Give Back my Rivers and Hills!

by I. Feng

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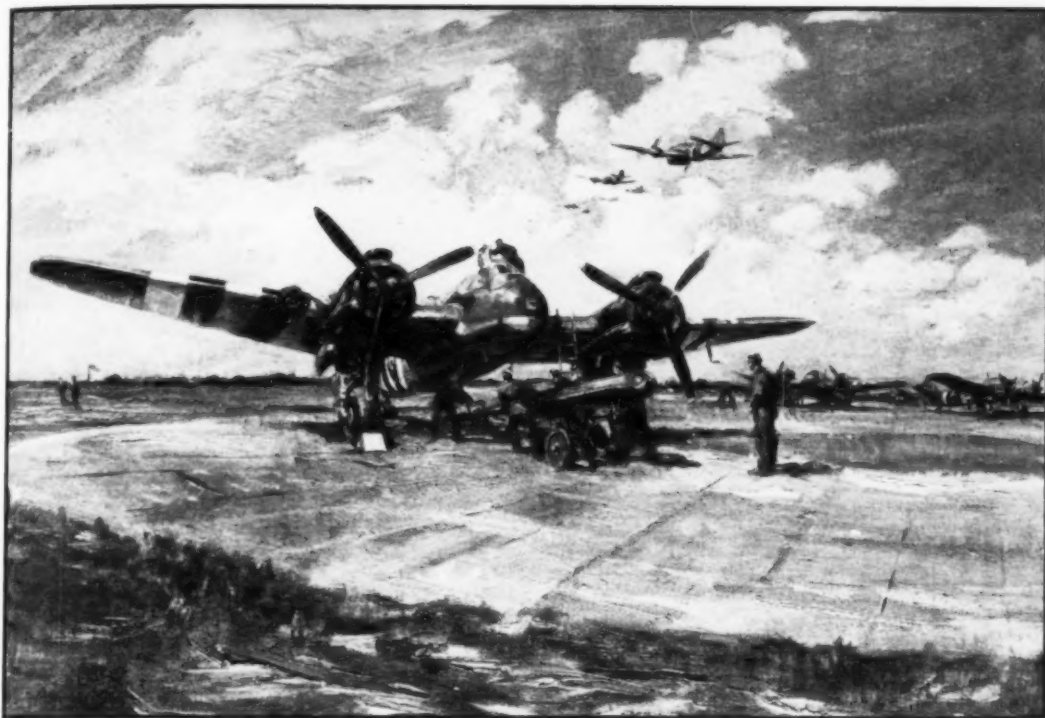
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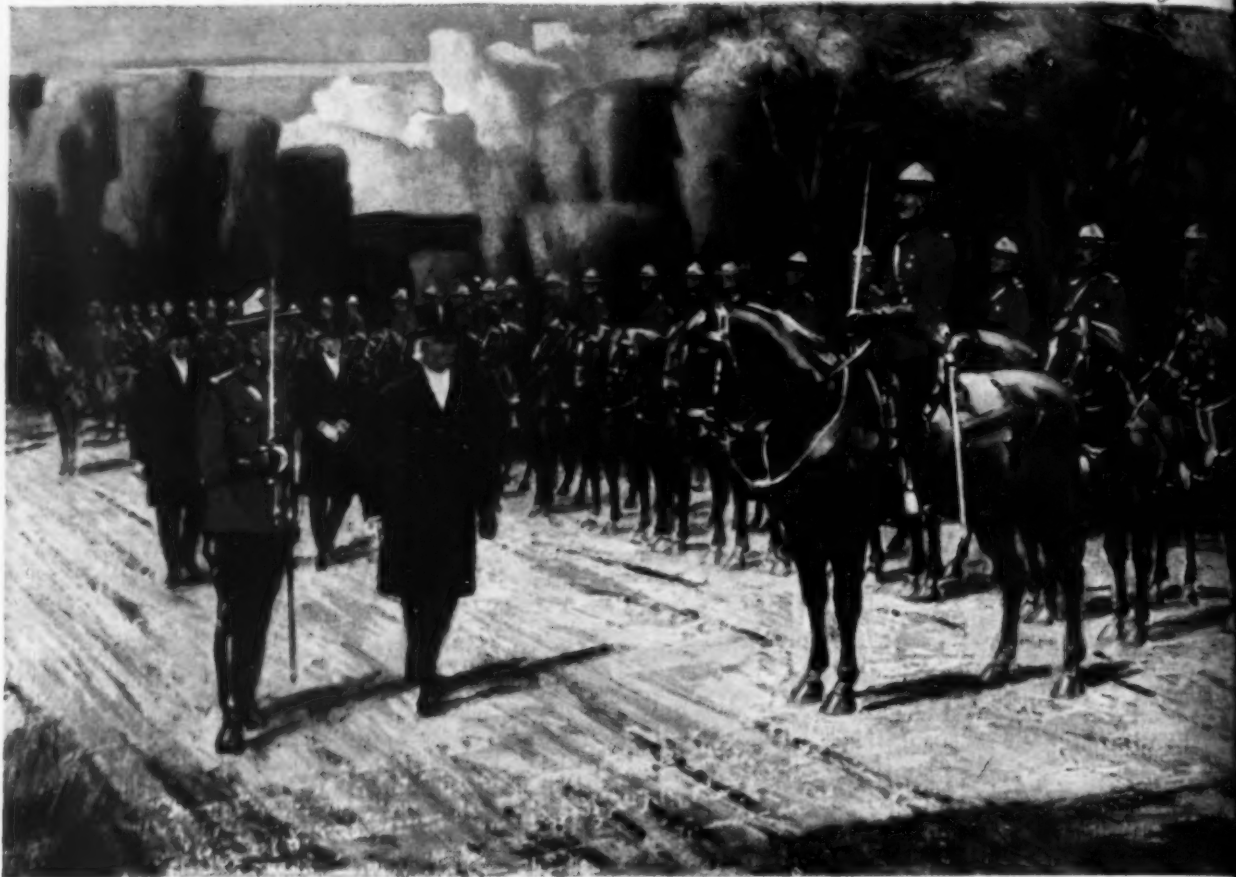
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Review of North West Mounted Police Contingent by Sir Wilfred Laurier in 1911. Painted by J. S. Hallam, A.R.C.A., O.

* * * * *

The Silent Force

IN THE YEAR 1873, the Canadian West was a vast, little-known territory and its administration appeared to be an almost insuperable task. Uncertain communications with Eastern Canada complicated the many problems of law enforcement and control.

Faced with this almost impossible situation Prime Minister Sir John A. MacDonald displayed a vision, faith and purpose incredible even today. A small group of 300 handpicked men

was formed and to it was entrusted the enormous task of bringing law and order to this unsettled tract of 300,000 square miles in accordance with his high ideals and great purpose. How this little band of men justified his faith and vision is one of the proudest records in Canadian history.

Thus was born "The Silent Force"—a gallant body of men who formed the first of Canada's famous North West Mounted Police. It was due to their courage, determination and strength of purpose Canada's great North West was made safe for settlement. The fame of the North West Mounted

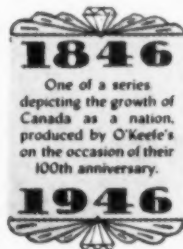
Police spread throughout the world. Even their enemies knew that they could rely on the word "Mountie", and their operations formed a pattern of law enforcement everywhere.

In 1911, as a recognition of services to the nation, they were chosen to represent Canada at the Coronation of George V. They were the "Silent Force", a gallant band of men whose faith and high purpose helped to lay the foundations of Canada of today.



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